SAF-RC-020 100-BC Burial Grounds – Soil Full Protocol FINAL VALIDATION PACKAGE

COMPLETE COPY OF VALIDATION PACKAGE TO:

Jeanette Duncan (2) H9-02

NITIALDATE 08/31/06

COMMENTS:

SDG K0438

SAF-RC-020

Waste Site: 120-B-1 Acid Sump



Date:

23 August 2006

To:

Washington Closure Hanford Inc. (technical representative)

From:

Project:

100BC Burial Grounds - Soil Full Protocol - Waste Sites 120-B-1 Acid

Sump

Subject: Inorganics - Data Package No. K0438-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. KO438 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	.Date
J12N48	6/13/06	Soil	С	See note 1
J12N49	6/13/06	Soil	С	See note 1
J12N50	6/13/06	Soil	С	See note 1
J12N51	6/13/06	Soil	С	See note 1
J12N52	6/13/06	Soil	С	See note 1
J12N53	6/13/06	Soil	С	See note 1
J12N54	6/13/06	Soil	С	See note 1
J12N55	6/13/06	Soil	С	See note 1
J12NC1	6/13/06	. Soil	С	See note 1

^{1 -} ICP metals (6010B) and mercury (7471A).

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, February 2005). Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Documentation Requested by Client

DATA QUALITY PARAMETERS

Holding Times

Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 28 days for mercury and 6 months for ICP metals.

All holding times were acceptable.

Preparation (Method) Blanks

Preparation Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "UJ". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the contract required detection limit (CRDL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the instrument detection limit (IDL) and less than or equal to the CRDL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

Due to method blank contamination, the boron result in samples J12N49, J12N51, J12N52 and J12N54 were qualified as estimates and flagged "UJ".

All other preparation blank results were acceptable.

Field (Equipment) Blank

One equipment blank was submitted for analysis (J12N55). Aluminum, barium, calcium, chromium, copper, iron, potassium, magnesium, sodium, silicon & zinc were detected in the equipment blank. Under the WCH statement of work, no qualification is required.

Accuracy

Matrix Spike and Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations.

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Recoveries must fall within the range of 70% to 130%. Samples with a recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a recovery of 30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 130% and a sample result less than the IDL, no qualification is required.

Due to a matrix spike recovery outside QC limits (188.2%), all calcium results were qualified as estimates and flagged "J".

Due to a matrix spike recovery outside QC limits (52.5%), all antimony results were qualified as estimates and flagged "J".

Due to an LCS recovery outside QC limits (43.6%), all silicon results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

Precision

Laboratory Duplicate Samples

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike duplicate (MSD) analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the CRDL and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All laboratory duplicate results were acceptable.

Field Duplicate

One set of field duplicates (J12N49/J12N50) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. The following RPDs were outside QC limits: Boron (159%), barium (91%), calcium (34%), chromium (57%), iron (32%) and magnesium (34%). Under the WCH statement of work, no qualification is required. All other field duplicate results were acceptable.

Analytical Detection Levels

Reported analytical detection levels are compared against the 100 Area RQLs to ensure that laboratory detection levels meet the required criteria. Seven silver, seven cadmium and eight selenium results exceeded the RQL. Under the WCH statement of work, no qualification is required. All other results met the RQL.

Completeness

Data package No. KO438 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following minor deficiencies were noted:

- Due to method blank contamination, the boron result in samples J12N49, J12N51, J12N52 and J12N54 were qualified as estimates and flagged "UJ".
- Due to a matrix spike recovery outside QC limits (188.2%), all calcium results were qualified as estimates and flagged "J".
- Due to a matrix spike recovery outside QC limits (52.5%), all antimony results were qualified as estimates and flagged "J".
- Due to an LCS recovery outside QC limits (43.6%), all silicon results were qualified as estimates and flagged "J".

Data flagged "J" indicates that the associated concentration is an estimate, but under the WCH statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

WCH, Contract #20266, Validation Statement of Work, Washington Closure Hanford Incorporated, July 7, 2003.

DOE/RL-96-22, Rev. 4, 100 Area Remedial Action Sampling and Analysis Plan, U.S. Department of Energy, February 2005.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with WCH validation SOW are as follows:

- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- BJ Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

METALS DATA QUALIFICATION SUMMARY*

SDG: K0438,		Project: 120-B-1	PAGE_1: OF 1
COMMENTS:	The state of the s		
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Boron	UJ	J12LN9, J12N51, J12N52 J12N54	Method blank contamination
Calcium	J	All	MS recovery
Antimony	J	All	MS recovery
Silicon	J	All	LCS recovery

^{* -} The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: WASI	ect: WASHINGTON CLOSURE HANFORD																		
		K0438																	
Sample Numbe		J12N48		J12N49		J12N50		J12N51		J12N52		J12N53		J12N54		J12N55		J12NC1	
Remarks						Duplicate										E. Blank			
Sample Date		6/15/06		6/15/06		6/15/06		6/15/06		6/15/06		6/15/06		6/15/06		6/15/06		6/15/06	_
	RQL	Result	Q			Result	a		_						-				Q
Silver	0.2	0.22	U	0.25	اد	4.2	U	0.23	U	0.22		0.24	ט	0.23		0.07	Ų	3.8	
Aluminum		5120		4430		4550		6250		6570		6700		4830	-	30.0		11700	
Arsenic	10	3.6	Ι	2.2		2.0	U	5.0	_	3.3		3.6		2.0		0.58	_	11.0	
Boron		1.6		0.92	3	8.1		1.3	บม		23	1.8	L	1.1			כ	4.2	
Barium	2	63.4		50.0		135		89.7		75.6		102		52.5		1.1	_	126	
Beryllium		0.18		0.07	رد	0.07		0.11		0.31		0.12	_	0.06		0.02	_	0.22	
Calcium		8150	J	3230	J	4570		5570		3890	_	6260	_	2250	_	18.6	_	17300	-
Cadmium	0.2	0.22	U	0.25	U	0.23		0.23		0.22	U	0.24	U	0.23	U	0.07		1.4	
Cobalt		7.8		4.7		3.6		5.5	_	9.1	<u> </u>	7.6	_	5.7	L	0.13		8.1	
Chromium	1	18.6		151		273		200		61.6	L	52.6	<u> </u>	142	_	0.15	<u> </u>	109	
Copper		17.9		13.1		11.8		18.4		16.7		19.8		12.7	_	0.25	<u> </u>	130	
Iron		20300		16100		11600		19300	_	16800	_	23200	<u> </u>	21100		108	Ļ	12300	
Mercury	0.2	0.02	U	0.04		0.04		0.02	U	0.02	U	0.09		0.03		0.02	υ	6.5	
Potassium		882		772	_	622	L	1110	乚	880	_	1140		736		14.9	<u> </u>	548	_
Magnesium		3810		2920	<u>_</u>	2060	L	3680		3760	_	3740	-	2840	-	5.6		6040	
Manganese		295		157	_	147	ᆫ	230		336		319		185		3.6		361	
Molybdenum		0.92		2.3		1.7		1.0	_	0.93	U_	2.1	_	2.1	_	0.28		8.2	
Sodium		228		230		198	_	158		134	<u> </u>	373	_	140		6.5	_	5200	
Nickel		9.0	_	7.7		6.6	_	12.3	_	13.8		12.9		7.5		0.23		25.7	_
Lead	5			15.1	_	11.9	_	6.1	_	4.6		15.4	_	10.0	_	0.30		4550	
Antimony			IJ		บป	<u>. </u>									UJ				
Selenium	1		U	1.7		1.5	_	1.6		1.5	_	1.6			U	0.45			3 U
Silicon		1050		524	_	631	_	755	•	688	-	564	<u>ا</u>	541	-	35.3		266	
Vanadium	<u> </u>	43.0	_	40.9		28.7		41.6		32.2	_	46.1	ļ_	55.9	_	0.09		27.9	
Zinc	1	43.7	<u>'</u>	59.5	1_	50.6	1_	38.8		45.5	<u> </u>	46.2	L	72.2	1	0.42	<u> </u>	241	ய

INORGANICS DATA SUMMARY REPORT 06/29/06

CLIENT: THUMANFORD RC-020 K0438
WORK ORDER: 11243-606-001-9999-00

LVL LOT #: 0606L291

					reporting	DILUTION	
Sample	SITE ID	ANALYTE	RESULT	UNITS	LINIT	FACTOR	
			****		*********		
-001	J12N48	Silver, Total		MG/KG	0.22	3.0 .	
		Aluminum, Total	5120	MG/KG	9.2	3.0	
	•	Arsenic, Total	2.6	MG/KG	1.9	3.0	
		Boron, Total	1.6	нс/кс	0.76	3.0	
	•	Barium, Total	63.4	MG/KG	0.06	3.0	
		Beryllium, Total	0.18	MG/KG	0.06	3.0	
		Calcium, Total	8250 J	NG/KG	5.2	3.0	
		Cadmium, Total	0.22 u	NG/KG	0.22	3.0	
	•	Cobalt, Total	7.8	mg/kg	0.45	3.0	
	•	Chromium, Total	18.6	NG/KG	0.41	3.0	
		Copper, Total	17.9	Mg/Kg	0.36	3.0	
		Iron, Total	20300	KG/KG	11.1	3.0	
		Mercury, Total	0.02 u	MG/KG	0.02	1.0	
		Potassium, Total	882 .	MG/KG	7.2	3.0	
•		Magnesium, Total	3810	MG/KG	3.1	3.0	
		Manganese, Total	295	MG/KG	0.1	3.0	
		Holybdenum, Total	0.92 u	MG/KG	0.92	3.0	
		Sodium, Total .	228	MG/KG	2.4	3.0	
		Nickel, Total	9.0	MG/KG	D.76 ·	3.0	
	•	Lead, Total	5.0	MG/KG	0.99	3.0	
	•	Antimony, Total	1.4 u]	MG/KG	1.4	3.0	
		Selenium, Total	1.5 u	MG/KG	1.5	3.0	
		Bilicon, Total	1050	MG/RG	7.2	3.0	
		Vanadium, Total	43.0	MG/KG	0.29	3.0	
		Zinc, Total	43.7	MG/KG	0.51	3.0	

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INORGANICS DATA SUMMARY REPORT 06/29/06

CLIENT: TNUHANFORD RC-020 K0438 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0606L291

				. •	reporting	DILUTION
SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	LINIT	PACTOR
******	***********	*****************	******	******		22000018
-002	J12N49	Silver, Total	0.25 u	MG/KG	0.25	3.0
•		Aluminum, Total	4430	MG/KG	10.2	3.0
:	•	Arsenic, Total	2.2 u	MG/KG	2.2	. 3.0
	•	Boron, Total	0.9203	ng/Ko	0.85	, 3.0
		Barium, Total	.0.0	MG/KG	0.07	3.0
		Beryllium, Total	0.07 u	MG/KG	0.07	3.0
		Calcium, Total	· 3230 J	NG/KG	5.8	,3.0.
		Cadmium, Total	0.25 u	ng/kg	0.25	3.0
		Cobalt, Total	4.7	MG/KG	0.49	3.0
		Chromium, Total	151	ng/kg	0.46	3.0
		Copper, Total	13.1	MG/KG	0142	3.0
		Iron, Total	16100	ng/kg	12.3	3.0
		Mercury, Total	0.04	MG/KG	. 0.02	· . 1.0
		Potassium, Total	772	MG/KG	9.0	3.0
		Sagnesium, Total	2920	NG/KG	3.4	3.0
	•	Manganese, Total	157	NG/KG	0.11	3.0
		Holybdenum, Total	. 2.3	MG/KG	1.0	3.0
		Sodium, Total	230	MG/KG	2.7	٥, د
		Nickel, Total	7.7	MG/KG	0.85	3.0
		Lead, Total	15.1	MG/KG	1.1	3.0
		Antimony, Total	1.6 U_	нс/кс	. 1.6	3.0
		Selenium, Total	1.7 u	MG/KG	. 1.7	3.0
		Silicon, Total	· 524 丁	MG/KG	8.0	3.0
•		Vanadium, Total	40.9	MG/XG	0.32	3.0
		Zinc, Total	59.5	MG/XG	0.56	3.0

8/23/09

INORGANICS DATA SUMMARY REPORT 06/29/06

CLIENT: TNUHANFORD RC-020 K0438 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0606L291

					REPORTING	DILUTION
SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	LINIT .	FACTOR
B###P##	*************		*******	*****	********	******
-003	J12N50	· Silver, Total	0.23 u	NG/KG	0.23	3.0
	•	Aluminum, Total	4550	ис/кс	9.4	. 3.0
		Arsenic, Total	2.0 u	HG/KG	2.0	3.0
		Boron, Total	8.1	MG/XG	0.79	. 3.0
	•	Barium, Total	135	MG/KG	0.07	3.0
		Beryllium, Total	0.07	MG/KG	0.07	3.0
	Calcium, Total	4570 J	MG/KG	5.4	3.0	
		Cadmium, Total	0.23 u	MG/KG	0.23	3.0
		Cobalt, Total	3.6	MG/KG	0.46	3.0
		Chromium, Total	273	MG/KG	0.43	3.0
•	•	Copper, Total	11.8	NG/KG	0,39	3.0
		Iron, Total	11600	NG/KG	11.4	3.0
		Mercury, Total	0.04	MG/KG	0.02	1.0
		Potassium, Total	622	MG/KG	7.4	3.0
	•	Nagnesium, Total	2060	MG/KG	3.2	. 3.0
		Manganese, Total	147	MG/KG	0.1	3.0
		Molybdenum, Total	1.7	MG/XG	0.95	3.0
		Sodium, Total	198	NG/XG	2.5	3.0
		Nickel, Total	6.6	MG/KG	0.79	3.0
		Lead, Total	11.9	MG/KG	1.0	3.0
	•	Antimony, Total	1.4 u	MG/KG	1.4	3.0
		Selenium, Total		, NG/KG	1.5	3.0
		Silicon, Total	631 Ĵ	MG/XG	7.4	3.0
		Vanadium, Total	28.7	MG/KG	. 0.29	3.0
		Zinc. Total	50.6	MG/KG	0.52	3.0

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INORGANICS DATA SUMMARY REPORT 06/29/06

CLIENT: TNUHANFORD RC-020 K0438 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0606L291

	•				Reporting	DILUTION
SAMPLE	SITE ID	ANALYTE	RESULT	UNITE	LIMIT	PACTOR
******	*************		*****	*****	*********	4000000
-004	J12N51	Silver, Total	0.23 u	MG/KG	0.23	3.0
		Aluminum, Total	6250	MG/KG	9.6	3.0
	•	Armenic, Total	. 5.0	но/ко	2.0	3.0
		Boron, Total	- 1.2 VJ	MG/KG	0.80	3.0
		Barium, Total	89.7	MG/KG	0.07	3.0
		Beryllium, Total	0.11	HG/KG	0.07	3.0
		Calcium, Total	6570 J	MG/KG	5.4	3.0
		Cadmium, Total	0.23 u	MG/KG	0.23	3.0
	•	Cobalt, Total	5.5	NG/KG	0.46	3.0
		Chromium, Total	200 -	NG/KG	0.43	3.0
	•	Copper, Total	18.4	MG/KG	0.40	3.0
		Iron, Total	19300	MG/KG	11.6	3.0
		Mercury, Total .	0.02, 11	MG/KG	0.02	. 1.0
		Potassium, Total	1110	mg/kg	7.5	3.0
		Hegnesium, Total	3680	MG/KG	. 3.2	3.0
		Kanganese, Total	230	на/ка	0.1	3.0
		Molybdenum, Total	1.0	HG/KG	0.96	3.0
		Sodium, Total	158	NG/KG	2.5	3.0
		Nickel, Total	12.3	MG/XG	0.80	3.0
		Lead, Total	6.1	HG/KG	1.0	3.0
		Antimony, Total	1.5 u	<u>Т</u> ис∕жа	1.5	9,6
		Selenium, Total	1.6 U	MG/XG	1.6	3.0
		Silicon, Total	755 J	MG/KG	7.5	3.0
•	•	Vanadium, Total	41.6	MG/XG	0.30	3.0
		Zinc, Total ;	38.6	MG/XG	0.53	3.0

8/23/06

INORGANICS DATA SUNMARY REPORT 06/29/06

CLIENT: TNUMANFORD RC-020 K0438 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0606L291

	•				reporting	DILUTION
SAMPLE	SITE ID	ANALYTE	result	ETINU	LINIT	PACTOR
			******	*****	********	******
-005	J12N52	Silver, Total	0.22 u	MG/KG	. 0.22	3.0
	•	Aluminum, Total	6570	MG/KG	. 9.2	3.0
		Arsenic, Total	3.3	MG/KG	1.9	3.0
		Boron, Total.	1.105	MG/KG	0.77	3.0
•		Barium, Total	75.€	MG/XG	0.06	o.c
•		Beryllium, Total	0.31	MG/KG	0.06	3.0
	•	Calcium, Total	3690	NG/KG	5.2	3.0
		Cadmium, Total	. 0.22 u	NG/KG	0.22	3.0
	Cobalt, Total	9.1	на/ка	0.45	à.o	
		Chromium, Total	61.6	NG/KG	0.41	3.0
		Copper, Total	16.7	NG/KG	0.38	3.0
		Iron, Total	16800	MG/KG	. 11.1	3.0
		Hercury, Total	0.02 u	нв/ка	0.02	1.0
•		Potassium, Total	880	на/ка	7.2	3.0
		Nagnesium, Total	3760	MG/KG	3.1	3.0
		Manganese, Total	336	MG/KG	0.1	3.0
		Molybdenum, Total	0.93 u	MG/KG	0.93	3.0
		Sodium, Total	134	MQ/KG	2.4	3.0
		Nickel, Total	13.8	MG/KG	0.77	3.0
		Lead, Total	4.6	NG/KG	0.99 .	3.0
		Antimony, Total	1.4 u	MG/KG	1.4	3.0
		Selenium, Total	1.5 u	HG/KG	1.5	3.0
		Silicon, Total	610 J	нв/ка	7.2	3.0
		Vanadium, Total	32.2	MG/KG	0.29	3.0
		Zinc, Total	45.5	MG/KG	0.51	3.0

8/23/06

INORGANICS DATA SUMMARY REPORT 06/29/06

CLIENT: TNUHANFORD RC-020 K0438 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0606L291

					reporting	DILUTION
Sarple	SITE ID	ANALYTE	RESULT	UNITS	LIMIT	PACTOR

-006	J12N53	Silver, Total	0.24 u	MG/KG	0.24	3.0
		Aluminum, Total	6700	ng/ka	10.0	3.0
		Arsenic, Total	3.6	MG/KG	2.1	3.0
		Boron, Total	1.6	mg/KG	0.84	3.0
		Barium, Total	102	ис/ко	0.07	3.0
•		Beryllium, Total	0.12	ng/kg	0.07	3.0
		Calcium, Total	6260 7	NG/KG	5.7	3.0
		Cadmium, Total	0.24 u	MG/KG	0.24	3.0
	٠,.	Cobelt, Total	. 7.6	MG/KG	0.49	3.0
	•	Chromium, Total	\$2.6	HG/KG	0.45	3.0
		Copper, Total	19.8	Mg/Kg	0.42	3.0
		Iron, Total	23200	MG/KG	12.2	3.0
	•	Hercury, Total	0.09	MG/KG	0.02	1.0
		Potassium, Total	1140	HG/KG	7.9	3.0
		Magnesium, Total	3740	ng/kg	3.4	. 3.0
		Manganese, Total	319	NG/KG	0.10	3.0
		Holybdenum, Total	2.1	MG/KG	1.0	3.0
		Sodium, Total	373 .	Mg/Kg	2.7	3.0
		Nickel, Total	12.9	MG/KG	0.84	3.0
		Lead, Total	15.4	HG/KG	1.1	3.0
		Antimony, Total	1.5 u]	MG/ICG	1.5	. 3.0
		Selenium, Total	-	HG/KG.	1.6	3.0
		Silicon, Total	564 J	но/ка	7.9	3.0
		Vanadium, Total	46.1	HG/KG	0.31	3.0
		Zinc, Total	46.2	NG/KG	0.56	3.0

8/23/a

INORGANICS DATA SUMMARY REPORT 06/29/06

CLIENT: TNUHANFORD RC-020 K0438 WORK ORDER: 11343-606-001-9999-00 LVL LOT #1 06061291

					REPORTING	DILUTION
SAMPLE	SITE ID	ANALYTE	RESULT	UNITE	LIKIT	PACTOR
		55*2502 n+box=200000000			**	
-007	J12N54	Silver, Total	0,23	MG/KG	0.23	3.0
		Aluminum, Total	4830	MG/KG	9.3	3.0
		Armenic, Total	2.0 u	MG/KG	2.0	3.0
	Boron, Total	1.1 UJ	MG/KG	0.77	3.0	
	Barium, Total .	52.5	MG/KG	0.06	3.0	
		Beryllium, Total	. 0.0€ T	MG/KG	0.06	3.0
	•	Calcium, Total	2250	MG/KG	5.3	3.0
		Cadmium, Total	0.23 u	MG/KG	0.23	. 3.0
		Cobalt, Total	5.7	HG/KG	0.45	3.0
		Chromium, Total	142	MG/KG	0.42	3.0
		Copper, Total	12.7	ng/kg	0.39	3.0
	•	Iron, Total	21100	KG/KG	11.2	3.0
		Mercury, Total	0.03	MG/KG	0.02	1.0
	•	Potassium, Total	736	MG/KG	7.3	3.0
	•	Magnesium, Total	2840	NG/KG	3.1	3.0
		Manganese, Total	185	MG/KG	0.1	3.0
		Molybdenum, Total	2.1	MG/KG	0.93	3.0
	•	Sodium, Total	140	MG/KG	2.4	3.9
		Nickel, Total	7.6	ма/ка	9.77	. 3.0
		Lead, Total	10.0	mg/Xg	1.0	3.0
		Antimony, Total	2.4 ບູ້	Тио/ко	1.4	3.0
		Selenium, Total	1.5 u	на/ка	1.5	3.0
		Silicon, Total	542 J.	MG/XG	7.3	3.0
		Vanadium, Total	55.9	MG/KG	0.29	3.0
		Zinc, Total	72.2	MG/KG	0.51	3.0

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INORGANICS DATA SUMMARY REPORT 06/29/06

CLIENT: TNUHANFORD RC-020 K0438 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0606L291

• •		•			reporting	DILUTION
Sanple	SITE ID	ANALYTE	RESULT	UNITS	LIMIT	FACTOR
		*******	******		****	*****
-002	J12N55 .	Silver, Total	0.07 u	kg/kg	0.07	1.0
		Aluminum, Total	30.0	MG/KG	2,.7	1.0
	•	Armenic, Total	0.58 u	MG/KG	0.56	1.0
		Boron, Total	0.23 u	MG/KG	0.23	1.0
	Barium, Total	1.1 -	MG/KG	0.02	1.0	
	Beryllium, Total	0.02 u	Mg/xg	0.02	1.0	
		Calcium, Total	18.6 J	HG/KG	1.6	1.0
		Cadmium, Total	0.07 u	HG/KG	0.07	1.0
	•	Cobelt, Total	0.13 u	ng/kg	0.13	1.0
		Chrowium, Total	0.15	HG/KG	0.12	1.0
		Copper, Total	0.25	ng/kg	0.11	1.0
		Iron, Total	108.	MG/KG	3.3	1.0
•		Hercury, Total	0.02 u	KG/KG	0.02	1.0
		Potaccium, Total	14.9	HG/KG	2.2	1.0
	•	Magnesium, Total	5.6	ка/ка	0.92	1.0
		Manganese, Total	1.6	HG/KG	0.03	1.0
		Molybdenum, Total	0.28 u	MG/KG	0.28	1.0
•	•	Sodium, Total	4.5	hg/kg	0.72	1.0
		Nickel, Total	0.23 u	HG/KG	0.23	1.0
		Lead, Total	0.30 L	HG/KG	0.30	1.0
		Antimony, Total	0.42 u	HG/KG	0.42	1.0
		Selenium, Total	0,45 U	•	0.45	1.0
		Silicon, Total	35.3 🎝	HG/KG	2.2	1.0
	_	Vanadium, Total	0.09 u	HG/KG	0.09	1.0
	-	Zino, Total	0.42	MG/KG	0.15	1.0

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INORGANICS DATA SUMMARY REPORT 06/29/06

CLIENT: TNUHANPORD RC-020 K0438 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0606L291

	•	•			REPORTING	DILUTION
SAMPLE	SITE ID	ANALYTE .	RESULT	UNITS	LINIT	FACTOR
******		************				
-009	J12NC1	Silver, Total	3.8	MG/KG	0.49	3.0
		Aluminum, Total	11700	MG/XG	20.1	3.0
		Armenic, Total	11.0	MG/XG	4.3	3.0
	Boron, Total	4.2	MG/XG	1.7	3.0	
	Barium, Total	126 .	MG/KG	0.14	3.0	
	Beryllium, Total	0.22	HG/KG	0.14	3.0	
	Calcium, Total	17300 J	HG/KG	11.5	3.0	
	Cadmium, Total	1.4	HG/XG	0.49	3.0	
		Cobalt, Total	8.1	MG/KG	0.98	3.0
		Chromium, Total	109	MG/KG	0.91	3.0
		Copper, Total	130	MG/XG	0.84	3.0
•		Iron, Total	12300	MG/KG	24.4	3.0
	•	Mercury, Total	6.5	MG/XG	0.17	5.0
		Potassium, Total	548	MG/KG	15.9	3.0
		Magnesium, Total	6040	MG/KG	6.8	3.0
		Manganese, Total	361	mg/kg	0.21	3.0
		Molybdenum, Total	8.2	мо/жа	. 2.0	3.0
		Sodium, Total	- 5200	MG/KG	5.3	3.0
		Nickel, Total	25.7	на/ка	1.7	3.0
		Lead, Total	4550	HG/KG	2.2	3.0
		Antimony, Total	17.0 J	MG/KG	3.1	3.0
		Selenium, Total	3.3 u	NG/KG	3.3	3.0
		Silicon, Total	266 J	MG/KG	15.9	3.0
	•	Vanadium, Total	27.9	MG/KG	0.63	3.0
		Zinc, Total	241	NG/KG	1.1	3.0

p/23/06

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation



Analytical Report

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Client: TNU-HANFORD RC-020

LVL#: 0606L291

SDG/SAF#: K0438/RC-020

W.O.#: 11343-606-001-9999-00

Date Received: 06-15-06

METALS CASE NARRATIVE

The following is a summary of the QC results accompanying the sample results. Lionville Laboratory (LvLI) certifies that all test results meet the requirements of NELAC except as noted below.

All soil samples are reported on a dry weight basis unless requested by the client, required by the method, or noted otherwise.

- 1. This narrative covers the analyses of 9 soil samples.
- 2. The samples were prepared and analyzed in accordance with methods checked on the attached glossary. All samples except for sample J12N55 were reported with a 3-fold dilution for ICP metals due to high concentrations and sample matrix.
- 3. All analyses were performed within the required holding times.
- 4. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury).
- 5. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).
- 6. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL), or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.
- 7. All ICP Interference Check Standards were within control limits.
- 8. All laboratory control samples (LCS) were within the 80-120% control limits with the exception of Silicon at 43.6%. Refer to the Inorganics Laboratory Control Standards Report. Associated sample results may be biased low.
- 9. The matrix spike (MS) recoveries for 5 analytes were outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 33 pages.

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10. For analytes where the ICP MS is out-of-control, a post-digestion MS (PDS) and serial dilution are performed. A PDS was prepared at meaningful concentration level for the following analytes:

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		PDS	PDS .
Sample ID	<u>Element</u>	Concentration (ppb)	% Recovery
J12N46	Aluminum	66,000	96.7
	Calcium	60,000	97.0
	Iron	66,000	102.8
	Antimony	300	96.6
•	Silicon	6,300	100.9

- 11. The duplicate analyses for 4 analytes were outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.
- 12. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.
- 13. LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state accreditations. For a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.
- 14. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

lain Baniels

Laboratory Manager

Lionville Laboratory Incorporated

jjw/m06-291

Date



Washington (Closure Hai	nford	С	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST RC-020-016 Page 1 of						rd 2						
Collector C. Martinez/D Howe	ers			any Contact ig Bowers	Teleobo 509-5	ne No. 31-0701					ct Coordin NER, JH	alor Pi	rice Code	•	Data Tui	- bauoraa
Project Designation 100-BC Burial Grou	nds - Sail Full Pr	rotocol		ling Location BC - 120-B-1 acid sun	np					SAF1 RC-02		Ai	ir Quality	•	14 da	963
Ice Chest No.	10-05	72		Lagbook No. L 1173-8		COA R120I	B12000	<u>.</u>			od of Shipi DEX	ment				9888
Shinned To EBERLINE SERVK	-	<u> </u>	Offsit	e Property No. AU	605	07	7		•	Bille	of Lading/	Air Bill No.	See	OSP	د .	96
POSSIBLE SAMPLI	E HAZARDS/R	EMARKS			1.	1				ļ				ł		
low pll				Preservation	None	Cool	*C	Cool 4C	Cool	ĸ						·
Special Handling a	ind/or Storage	!	•	Type of Container	aG	3.0	·	aG	a.G							•
NOTE TRE 6				No. of Container(s)		1	Ì	. I	1		ĺ		ł	1		
Cost &				Volume	250mL	, 120n	Ja	120mL	1200	aL		•				
00024	s	ample anai	LVSIS		Sea Item (1) at Special Instructions.	Hex = 7		PCB4 - \$062	IC Aniu 300 0; (Soil) -	ρH		•				•
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J12N49		SOIL		1235	7		,		J	-			1	 	 	
J12N50		SOIL		1240	\	12		7	7				1	 	 	
J12N51		SOIL		1250		7		(V	-					 	
J12N52		SOIL	66/13/04		1			·		_			-	 -	 	
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1	Dispusal Method		•		•.		_	Dispo	scd By		<u> </u>				Date Time	

Washington Closure Hanford			CHAIN OF CUSTODY/SAMPLE ANALTSIS REQUEST						Page I	ge 1 of 1				
Collector C. Martinez/D Bowers			Company Contact Telephone No. Project Coordinatur Daug Bowers 509-531-0701 RESSNER, JH					rice Code Data Turnaround		naround N				
Project Designation 100-BC Burial Grounds - Soil Full Pr	rotocol						SAF No. RC-020	Ai	r Quality		14 days 8			
Ice Chest No. TNU-05			Field Logbook No. EFL 1173-8		COA R120E		Method of Shipment FED EX		pment			<u> </u>	. 1 88	
Shipped To EBERLINE SERVICES / LIONVILL	E	Offsite	Property No. AC	1605	7	7	· .		Bill of Ladins	√Air Bill No.	Se	e 05	PC	ō
POSSIBLE SAMPLE HAZARDS/R		•		None	Cool	•c	Cool 4C	Cool	c				į	
low pll			Preservation	aG	· aG		aG	aG			ļ			
Special Handling and/or Storage	•		Type of Container		ļ				·					
ine TRE 6-14-4 =			No. of Container(s)		1					<u> </u>				
c Cool 40c	•		Volume	250mL	120n	nL	120mL	120.	.					
00	AMPLE ANALYS	SIS		See item (1) in Special Instructions	Chrom Hex • 1		PCBs - 8082	IC And 300.0; (Soil) -	ρH					
	Matrix •	Sample Date	Sample Time		12.0	g in the contract of the contr	##2005	55.20K		3 - 1	10 G # 1 44	*053.93	- Maria (6)	The second second
Sample No.		c/13/06		 	-	e iyasa •				Contractor of	32		-3914-	100 TO 10
J12N54	SOIL O	1	1312	7		-	7	<u> </u>			 	 	 	
J12N55	SOIL		1315		TPE	.11-26		77%	, if a		-	-	<u> </u>	
J12NC1	SOIL 8	6/13/06		7		•	,	7	•	·				
				1			•							
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The Manual of 14	Date/Time -06 /500	Received By Sto	Ex	late/Time	_		•							4+4a US-Dros Sends DL=Dross Ligada 3+Timag
Reminister Dr. Kennoved From 6-15-06	Date I kno	Received By Ski	ned in 6-15-06	oteTime 1941										NY-Nac Letaped Veligetare
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LABORATORY Received By SECTION				Ti	tie .								Date/Time	
FINAL SAMPLE Disposal Method DISPOSITION	 						Disp	aci liy					Date/Tune	•

Appendix 5

Data Validation Supporting Documentation

<u>V</u> ALIDATION LEVEL:	A	В	(c)	D	E
PROJECT: 2	10-B-1		DATA PACKAG	E: KOYJI	
VALIDATOR:		LAB: LL	I .	DATE: 8 1	9/00
			SDG:	KO438	
		ANAEYSES	PERFORMED		
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide		
		<u> </u>	·		
SAMPLES/MAT	RIX		:]
712N4	8 712	<u>049 J</u>	12,050	TIZUSI	JIZUSZ
TIZUS			12NSS 2	TIZUCI	
		·-		, <u>, , , , , , , , , , , , , , , , , , </u>	
	····				
					soi/
Technical verificati Comments:	on documentation	present?			Yes No N/A
	· · ·		· · · · · · · · · · · · · · · · · · ·	······································	
			•	•	
Initial calibrations p Initial calibrations a ICP interference ch	performed on all insucceptable?ecks acceptable?	struments?		els D and E)	Yes No N/A Yes No N/A
ICV and CCV chec	ks acceptable?	44444-4444444-44444	******************************		Yes No N/A
Standards traceable	7	******************************	TF+5100+10+440444+++11+0406944+		Yes No N/A
Standards expired?	12>>>>	*************************	*********		Yes No N/A
	=			*********************	
Comments:					

3. BLANKS (Levels B, C, D, and E)	
ICB and CCB checks performed for all applicable analyses? (Levels D, E)	Yes No (N/A)
ICB and CCB results acceptable? (Levels D, E)	Yes No (N/A)
Laboratory blanks analyzed?	Yes No N/A
Laboratory blank results acceptable?	
Field blanks analyzed? (Levels C, D, E)	- 1/4
Field blank results acceptable? (Levels C, D, E)	Yes (N)
Transcription/calculation errors? (Levels D, E)	Yes No 🐼
Comments: baren - UT 49,52,54,51	·
- Sengthane - 03 - 50, 51, 53 & 8/20/m	40 Fall
EB-55 of Bo Colon Chroma Cus E K north	7. S
EB-55- al, Ba, Colcin, Chranin, Cu, Fe, K, pott Sodium, Siliim + Zine	Trong may re story
4. ACCURACY (Levels C, D, and E)	•
· · · · · · · · · · · · · · · · · · ·	Ves No. N/A
MS/MSD samples analyzed?	Ves No N/A
MS/MSD standards NIST traceable? (Levels D, E)	~ ~
MS/MSD standards expired? (Levels D, E)	\sim
LCS/BSS samples analyzed?	_
LCS/BSS results acceptable?	`
Standards traceable? (Levels D, E)	\ ,
Standards expired? (Levels D, E)	Ves No N/A
Transcription/calculation errors? (Levels D, E)	
Performance audit sample(s) analyzed?	
Performance audit sample results acceptable?	~
Comments: Ms calcium - 1883 - Jall	no PA
Antimoy - Sz.s - Jaly	7-0 1-51
LCS Silian 43.69 Jall	
	·
· · · · · · · · · · · · · · · · · · ·	
	·
	•

5. PRECISION (Levels C, D, and E)			
Duplicate RPD values acceptable?	(₂₀ %).	No N	I/A
Duplicate results acceptable?	Yes	No N	1/10
MS/MSD standards NIST traceable? (Levels D, E)	Yes	No(N	蚁
MS/MSD standards expired? (Levels D, E)	Yes	No ([/A)
Field duplicate RPD values acceptable?	Yes	No) M	
Field split RPD values acceptable?	Yes	No()	\mathbb{A}
Transcription/calculation errors? (Levels D, E)	Yes	No (V	<u>1/</u> X′
Comments: FD Boom - 15970 m gresson 342	•		_
Calcin 347.			
#D- chramium - 57%			
1ran - 32			<u> </u>
6. ICP QUALITY CONTROL (Levels D and E) ICP serial dilution samples analyzed? ICP post digestion spike required? ICP post digestion spike values acceptable? Standards traceable? Standards expired? Transcription/calculation errors? Comments:	Yes Yes Yes Yes	No N	I/A I/A I/A I/A I/A
	·		_
			_

7.	FURNACE AA QUALITY CONTROL (Levels D and)	E)			,	\wedge
Duplic	cate injections performed as required?	*******************************	•••••	Yes	No	N/A
Duplic	cate injection %RSD values acceptable?		**********	Yes	No	N/A
Analyt	tical spikes performed as required?	***************************************	••••••	Yes	No	N/A
Analyt	tical spike recoveries acceptable?	***********************	•••••	Yes	No	N/A
Standa	ards traceable?		************	Yes	No	N/A
Standa	ards expired?	*************************	**********	Yes	No	N/A
MSA p	performed as required?	*	***************************************	Yes	No	N/A
MSA r	results acceptable?	***********************	***************	Yes	No	N/A
	cription/calculation errors?		************************	Yes	No	N/A
Comm	nents:		· · ·			
	·	•	· · · · ·		· 	
·		· · · · · · · · · · · · · · · · · · ·				
			· · ·			
	•		•			
8.	HOLDING TIMES (all levels)			A	•	
Sample	es properly preserved?	***************************************	************	Yes		N/A
Sample	e holding times acceptable?	*************	••••••••	.\Yes	No	N/A
Comm	nents:					
		<u> </u>				
		· ·	· · · · · · · · · · · · · · · · · · ·			
			<u> </u>	·		
		· 				
·			<u> </u>			

9.	RESULT QUANTITATION AND DETECTION LIMITS (all levels)		\sim		
Results	reported for all requested analyses?	*************	(. Yes	No	7 54₹₹
	supported in the raw data? (Levels D, E)			4	,
Sample	s properly prepared? (Levels D, E)	• • • • • • • • • • • • • • • • • • • •	Yes	No	MIA
Detecti	on limits meet RDL?		Yes	No	<u>N/</u> A
Transcr	iption/calculation errors? (Levels D, E)		Yes	No	(N/A)
Commo	inter Silver - 7 care			<u>.</u>	
	Codmin - 7 ora				
	Sclenn - 8 oran				
		<i>:</i>	•		
		· .			
		•		•	

Appendix 6

Additional Documentation Requested by Client

INORGANICS NETHOD BLANK DATA SUMMARY PAGE 06/29/06

CLIENT: TNUHANFORD RC-020 K0438 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0606L291

					REPORTING	DILUTION
Sample	· SITE ID	ANALYTE	RESULT	UNITS	LINIT	PACTOR
*****			******	*****		
BLANK1	06L0394-KB1	Silver, Total	0.07 u	MG/KG	. 0.07	1.0
•		Aluminum, Total	2.9 u	HG/KG	. 2.9	. 1.0
		Arsenic, Total	0.61 u	MG/KG	0.61	1.0
		Boron, Total	0.29	HG/KG	0.24	1.0
		Barium, Total	0.03	NG/KG	0.02	1.0
	•	Beryllium, Total	0.02 u	MG/KG	0.02	1.0
		Calcium, Total	3.0	MG/KG	1.6	1.0
		Cedmium, Total	0.07 u	NG/KG	0.07	1.0
	•	Cobalt, Total	0.14 u	на/ка	0.14	1.0
		Chromium, Total	0.13 u	ng/kg	0.13	1.0
		Copper, Total	0.12 u	NG/KG	0.12	1.0
		Iron, Total	3.5 u	MG/KG	3.5	1.0
	·	Potessium, Total	2.3 u	NG/KG	2.3	, 1.0
	•	Magnesium, Total	0.97 u	NG/KG	0.97	1.0
		Manganese, Total	0.03 u	MG/KG	0.03	1.0
		Molybdenum, Total	0.29 u	MG/KG	0.29	1.0
		Sodium, Total	0.76	MG/KG	0.76	1.0
		Nickel, Total	0.24 u	но/ко	0.24	1,.0
		Lead, Total	0.31 u	MG/KG	0.31	1.0
		Antimony, Total	0.44 u	MG/KG	9.44	1.0
		Selenium, Total .	0.47 น	MG/KG	0.47	1.0
	•	Silicon, Total	2.3 u	NG/KG	2.3	1.0
		Vanadium, Total .	0.09 u	NG/KG	0.09	1.0
•		Zinc, Total	0.16 u	NG/KG	0.16	1.0
BI.ANK1	06C0123-MB1	Nercury, Total	0.02 u	NG/KG	0.02	1.0

INORGANICS ACCURACY REPORT D6/29/D6

CLIENT: TNUHANFORD RC-020 K0438 WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0606L291

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	initial Result	SPIKED ANOUNT	*RECOV	DILUTION PACTOR (SPK)
	*************			******			
-001	J12N48 .	Silver, Total	4.5	0.224	5.3	92.5	3.0
		Aluminum, Total	6650	5120	212	720.5*	3.0
	•	Armenic, Total	196	3.6	212	91.7	3.0
	•	Boron, Total	96.9	1.6	106	B>.B	J.0
		Barium, Total	269	63.4	212	96.9	3.0
•		Beryllium, Total	5.2	0.18	5.3	94.6	3.0
		Calcium, Total	13100	8150	2650	188.2	3.0
	,	Cadmium, Total	4.7	0.22u	5.3	88.7	3.0
		Cobalt, Total	58.1	7.9	53.1	34.7	3.0
	•	Chronium, Total	41.3	19.6	21.2	107.1	3.0
		Copper, Total	44.2	17.9	26.5	99.2	3.0
	,	Iron, Total	21300	20300	106	942.3*	3.0
	•	Potassium, Total	3400 -	482	2650	94.9	3.0
		Magnesium, Total	6460	3810	2650	99.6	3.0
		Nanganese, Total	356	295	53.1	115.3*	3.0
	,	Molybdenum, Total	99.5	0.92u	106	93.8	3.0
	•	Sodium, Total	2740	228	2650	94.7	. 3.0
		Nickel, Total	59.2	9.0	53.1	95.7	3.0
		Lend, Total	54.4	5.0	53.2	93.0	3.0
	•	Antimony, Total	27.9	1.4 u	53.1	52.5	. 3.0
		Selenium, Total	193	1.5 u	212	90.8	. 3.0
		Silicon, Total	1380	1050	106	312.2*	3.0
		Vanadium, Total	97.0	43.0	53.1	101.7	3.0
		Zinc, Total	100	43.7	. 53.3	106.6	3.0

INORGANICS ACCURACY REPORT 06/29/06

CLIENT: TNUHANFORD RC-020 K0438 WORK ORDER: 11343-606-D01-9999-00 LVL LOT #: 0606L291

	•		SPIKED	INITIAL	SPIKED	DILUTION
SAMPLE	SITE ID	ANALYTE	SAMPLE .	RESULT	AMOUNT TRECOV	FACTOR (SPK)
,,,,,,,,		****************	******			
-005	J12N52	Hercury, Total	0.18	0.024	0.16 109.4	1.0

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 06/29/06

CLIENT: TNUHANPORD RC-020 K0438 WORK ORDER: 11342-606-001-9999-00 LVL LOT #: 0606L291

	·		INITIAL			DILUTION
Sample	SITE ID	ANALYTE	result	REPLICATE	RPD	PACTOR (REP)
******		***************************************		********		
-001REP	J12N48	Silver, Total	0.22u	0.224	NC	3.0
	•	Aluminum, Total	5120	5240	2.2	3.0
		Arsenic, Total	3.6	4.5	22.2	2.0
		Boron, Total	1.6	1.0	11.8	3.0
•		Barium, Total	63.4	60.3	. 2.D	3.0
		Beryllium, Total	0.18	0.16	16.8	3.0
		Calcium, Total	2150	10800	28.0	3.0
		Cadmium, Total	0.22u	0.22u	ИC	3.0
		Cobalt, Total	7.8	6.7	15.2	3.0
		Chromium, Total	18.6	14.4	25.5	2.0
		Copper, Total	17.9	17.5	2.3	3.0
	·	Iron, Total	20300	18300	10.4	3.0
		Potensium, Total	682	817	7.6	3.0
		Hagnesium, Total	3810	3810	0.084	3.0
		Manganese, Total	295	267	10.2	3.0
	• .	Molybdenum, Total.	0.92u	0.924	ИÇ	3.0
		Sodium, Total	228	246	7.3	3.0
		Nickel, Total	9.0	8.2	9.3	. 3.0
		Lead, Total	5.0	5.5	9.5	3.0
	•	Antimony, Total .	1.4 u	1.4 u	ис	. 3.0
	•	Selenium, Total	1.5 u	1.5 u	NC .	3.0
		Silicon, Total	1050	779	29.9	3.0
		Vanadium, Total	43.0	41.8	2.8	3.0
•		Zinc, Total	43.7	50.9	15.2	3.0

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 06/29/06

CLIENT: TNUHANPORD RC-020 K0438

LVL LOT #: 0606L291

WORK	ORDER:	11343-606-001-9999-00

			INITIAL			DIMITOR
SAMPLE	SITE ID	ANALYTE	RESULT	REPLICATE	RPD	FACTOR (REP)
*****	***********	***************************************		*******		
-005REP	J12N52	Mercury, Total	0.02u	0.024	, אכ	1.0

Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 06/29/06

CLIENT: TNUHANFORD RC-020 K0438 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0606L291

-	•	•	SPIKED	SPIKED		
SAMPLE	SITE ID	ANALYTE	SAMPLE	THUOMA	UNITS	*RECOV
******				*****		
LC\$1	06L0394-LC1	Silver, LCS	48.8	50.0	MG/KG	97.6
	•	Aluminum, LCS	419	500	NG/KG	97.8
	•	Arsenic, LCS	922	1000	HG/KG	92.2
		Boron, LCS	467	500	NG/KG	93.3
		Barium, LCS	491	500	MG/KG	98.2.
		Beryllium, LCS	23.8	25.0	MG/KG	95.2
		Calcium, LCS	2370	2500	MG/KG	94.7
	ē	Cadmium, LCS	23.3	25.0	ис/ка	93.2
		Cobalt, LCS	242	250	ng/kg	97.0
		Chromium, LCS	48.5	50.0	MG/KG	97.0
		Copper, LCS	124	125	HG/KG	99.4
	•	Iron, LCS	489	500	NG/KG	97.7
	•	Potassium, LCS	2380	2500	HG/KG	25.3
	•	Magnesium, LCS	2350	2500	MG/KG	94.1
	•	Manganese, LCS	73.5	75.0	MG/KG	98.0
		Molybdenum, LCS	491	500	MG/KG	98.2
		Sodium, LCS	2420	2500	MG/KG	96.7
	•	Nickel, LCS	192	200	MG/KG	95.3
		Lead, LCS	238	250	MG/XG	95.4
		Antimony, LCS	283	300	NG/KG	94.3
		Selenium, LCS	890	1000	MG/XG	29.0
	·	silicon, LCS	210	500	MG/KG	43.6
		Vanadium, LCS	245	250	NG/KG	97.8
		Zinc, LCS	94.0	100	MG/KG	94.0
T.CE1	0600123-123	Mercury, LCS	. 6.3	6.2	MG/KG	102.0

Date:

23 August 2006

To:

Washington Closure Hanford Inc. (technical representative)

From:

TechLaw, Inc.

Project:

100BC Burial Grounds - Soil Full Protocol - Waste Site 120-B-1 Acid

Sump

Subject: PCB - Data Package No. K0438-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0438 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID.	Sample Date	Area Vedlavska	Validation	Date
J12N48	6/13/06	Soil	С	PCBs by 8082
J12N49	6/13/06	Soil	С	PCBs by 8082
J12N50	6/13/06	Soil	С	PCBs by 8082
J12N51	6/13/06	Soil	C	PCBs by 8082
J12N52	6/13/06	Soil	С	PCBs by 8082
J12N53	6/13/06	Soil	С	PCBs by 8082
J12N54	6/13/06	Soil	С	PCBs by 8082
J12N55	6/13/06	Soil	С	PCBs by 8082
J12NC1	6/13/06	Soil	С	PCBs by 8082

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, February 2005). Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers

Appendix 2. Summary of Data Qualification

Appendix 3. Qualified Data Summary and Annotated Laboratory Reports

Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation

Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

Holding Times

Sample data were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

A. HARLESTAN PROPERTY SECTION STATES

If holding times are exceeded by less than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detected sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were acceptable.

Method Blank

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation or analysis. At least one method blank analysis must be conducted for every 20 samples. Method blanks should not contain target compounds at a concentration greater than required quantitation limit (RQL). If target compounds are present, sample results less than five times the blank concentration are qualified as undetected and flagged "U". If the sample result is less than five times the blank concentration and less than RQL, the result is qualified as undetected and elevated to the RQL.

All method blank results were acceptable.

Field Blanks

One equipment blank was submitted for analysis (J12N55). All equipment blank results were acceptable.

Accuracy

Matrix Spike & Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 70% to 130%. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Non-detected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

All accuracy results were acceptable.

an carara na agua a ta cobara san maing paga a paga abar sang aga ta basa na na na n

Surrogate Recovery

The analysis of surrogate compounds provides a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory. When a surrogate compound recovery is outside the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Non-detected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Non-detected compounds with surrogate recoveries above the upper control limit require no qualification.

All surrogate results were acceptable.

Precision

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed as the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. For soil samples, results must be within RPD limits of plus/minus 30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All precision results were acceptable.

Field Duplicate Samples

One set of field duplicates (J12N49/J12N50) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

Analytical Detection Levels

Reported analytical detection levels are compared against the 100 Area RQLs to ensure that laboratory detection levels meet the required criteria. All undetected analytes in sample J12NC1 exceeded the RQL. Under the WCH statement of work, no qualification is required. All other results met the RQL.

Completeness

Data Package No. K0438 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

All undetected analytes in sample J12NC1 exceeded the RQL. Under the WCH statement of work, no qualification is required.

REFERENCES

WCH, Contract #20266, Validation Statement of Work, Washington Closure Hanford Incorporated, July 7, 2003.

DOE/RL-96-22, Rev. 4, 100 Area Remedial Action Sampling and Analysis Plan, U.S. Department of Energy, February 2005.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the procedures herein are as follows:

- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value.

 The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

PCB DATA QUALIFICATION SUMMARY*

SDG::K0438.		(REVIEWER	Project:	1/20-B-4	PAGE	<u>1_0F 1</u>
COMMENTS:	No qualifiers a	ssigned				

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

经国际工程 医对外的 医克里克氏性神经炎 医克勒氏病 医二种

Project: WASHINGTO	CLOSURE	HANFORD)]															
Laboratory: LLI	SDG: K	(0438																	
Sample Number		J12N48		J12N49		J12N50		J12N51		J12N52		J12N53	1	J12N54		J12N55		J12NC1	
Remarks						Duplicate						<u> </u>				E. Blank		<u> </u>	
Sample Date		6/15/06		6/15/06		6/15/06		6/15/06		6/15/06		6/15/06		6/15/06		6/15/06		6/15/06	
Extraction Date		6/20/06		6/20/06		6/20/06		6/20/06		6/20/06		6/20/06		6/20/06		6/20/06		6/20/06	
Analysis Date		7/10/06		7/10/06		7/10/06		7/6/06		7/6/06	_	7/6/06		7/10/06		7/10/06		7/20/06	
PCB	RQL	Result	ø	Result	Q	Result	Q	Result	Q	Result	Q	Result C	2	Result	σ	Result	Q	Result	Q
Aroclor-1016	100	15	บ_	16	U	15	U	16	U	15	U	16 (<u> </u>	15	Ü	13	U	320	<u> </u>
Aroclor-1221	100	9.8		_ 16	U_	15	U	16	Ų_	15	U	16 (ı 🗌	15	υ	13	U	320	<u>) U</u>
Aroclor-1232	100	15	U_	16	U	15	U	16	Ü	15	U	16 נ	,	15	Ų	13	U	320	טונ
Aroclor-1242	100	15	Ü	16	υ	15	U	16	ĺυ	15	U_	16 (į	_15	Ü	13	U	320	JU
Aroclor-1248	100	15	U_	16	U	_15	U	16	U	15	υ	16	j	15	U	13	U	320	<u> </u>
Arocior-1254	100	15	Ū	16	U	15	U	16	Ų.	15	U	16	J	15	U	13	U	1900)
Aroclor-1260	100	15	Ū	170		96		16	U	15	U	70		22		13	U	3600	<u>) </u>

Report Date: 07/20/06 10:19 PCBs by GC

	Cust ID:	J12N48	,	J12N49)	J12N50	•	J12N51		J12N52		J12N5	2
Sample	RFW#:	. 001		002		003	•	004		005	i	005 M	S
Information	Matrix:	SOIL	•	SOIL		SOIL		SOIL		SOIL		SOIL	1
	D.P.:	1.0		1.0	-	1.0		1.0	0	1.0	0	1.	
•	Units:	UG/K	IG ,	DG/X	CG .	UG/K	G	UG/K	G	UG/K	G	. UG/	KG
Surrogate:	Tetrachloro-m-xylene	84	k	· 101	Ł	93	*	66	*	87	*	93	¥
	Decachlorobiphenyl	. 78	% =fl=	95 _.		94	∛ =f1==	62	* =fl==	88	å. æfl	91	ዩ 1==:
Aroclor-1016		.15	บ	16	U	15	บ	16	ט	15	U	85	*
Aroclor-1221		9.8	J	16	U	15	ט	16	ប	15	U	15	U
Aroclor-1232		15	U	16	U.	15	บ	. 16	U	15	. บ	15	U
Aroclor-1242		15	Ü	16	ַ ָּט	15	ū	16	U	15	U	_. 15	ξ
3		15	Ū	. 16	Ŭ	· 15	U	16	U	15	U	15	τ
			-		-		•		•		_		
Aroclor-1248 Aroclor-1254 Aroclor-1260		15 15	บ	16 170	Ŭ	15 96	ŭ	16 · 16	ŭ	15 15	U U	. 15 90	. t
Aroclor-1254		15	U U	16		15	Ü	16	U U	15	U U	· 15	
Aroclor-1254 Aroclor-1260	Cust ID:	15 15 J12N52	U U	16 170	Ü	15 96 J12N54	Ū	16 · 16 · J12N55	U	15 15 J12NC1	ŭ	15 90 PBLKKF	i. t
Aroclor-1254 Aroclor-1260	Cust ID:	15 15 J12N52	U U	16 170 J12N53	Ü	15 96 J12N54	Ū	16 16 J12N55	U	15 15 J12NC1	ŭ	15 90 PBLKKF 06LE0510-	
Aroclor-1254 Aroclor-1260 D Sample Information	Cust ID: RFW#: Matrix:	15 15 J12N52 005 MSD SOIL	U U .	. J12N53	Ü	15 96 J12N54 007 SOIL	U	16 · 16 · J12N55 008 SOIL	U U	15 15 J12NC1 009 SOIL	U	PBLKKF 06LE0510-	MB:
Aroclor-1254 Aroclor-1260 C Sample Information	Cust ID:	15 15 J12N52	ט ט	16 170 J12N53	Ü	15 96 J12N54	Ü	16 16 J12N55	U U	15 15 J12NC1	U U	PBLKKF 06LE0510-	. 00
Aroclor-1254 Aroclor-1260	Cust ID: RFW#: Matrix: D.F.: Units: Tetrachloro-m-xylene	J12N52 005 MSE SOIL 1.00	ט ט	16 170 J12N53 .006 SOIL 1.0	Ü	15 96 J12N54 007 SOIL 1.0	Ü	16 · 16 · J12N55 008 SOIL 1.0	U U	J12NC1 009 SOIL 10.	U U	15 90 PBLKKF 06LE0510- SOIL 1. UG/	. 00
Aroclor-1254 Aroclor-1260 Demple Information	Cust ID: RFW#: Matrix: D.F.: Units:	15 15 J12N52 005 MSD SOIL 1.0 UG/K	U U U O O C G	16 170 J12N53 006 SOIL 1.0 UG/H	U OO CG	15 96 007 SOIL 1.0 UG/R 97 93	U C G F	16 16 J12N55 008 SOIL 1.0 UG/K	U U C C	J12NC1 009 SOIL 10. UG/F	U U .0 .0 .CG	15 90 PBLKKF 06LE0510- SOIL 1. UG/	MB:
Aroclor-1254 Aroclor-1260 Sample Information	Cust ID: RFW#: Matrix: D.F.: Units: Tetrachloro-m-xylene Decachlorobiphenyl	J12N52 005 MSE SOIL 1.0 UG/K 88 91	U U U C C C C	16 170 J12N53 .006 SOIL 1.0 UG/R	00 (G	15 96 J12N54 007 SOIL 1.0 UG/R 97 93	0 G *	16 16 312N55 008 SOIL 1.0 UG/X	U U G G	J12NC1 009 SOIL 10. UG/F	0 3 1	15 90 PBLKKF 06LE0510- SOIL 1. UG/	MB:
Aroclor-1254 Aroclor-1260 Sample Information	Cust ID: RFW#: Matrix: D.F.: Units: Tetrachloro-m-xylene Decachlorobiphenyl	J12N52 005 MSD SOIL 1.0 UG/K	U U U O O C G	16 170 J12N53 . 006 SOIL 1.0 UG/H	U OO CG	15 96 007 SOIL 1.0 UG/R 97 93	U	16 16 312N55 008 SOIL 1.0 UG/K	U U U G G * *	15 15 312NC1 009 SOIL 10. UG/F	U U U	15 90 PBLKKF 06LE0510- SOIL 1. UG/	000 /KG
Aroclor-1254 Aroclor-1260 Dample Information Surrogate: Aroclor-1016 Aroclor-1221	Cust ID: RFW#: Matrix: D.F.: Units: Tetrachloro-m-xylene Decachlorobiphenyl	J12N52 005 MSD SOIL 1,0 UG/K 88 91	U U U G G	16 170 J12N53 .006 SOIL 1.0 UG/R	U 00 CG * ==fl===	15 96 007 SOIL 1.0 UG/R 97 93	0 G % %	16 16 312N55 008 SOIL 1.0 UG/K	U U U CG * * * U U	15 15 009 SOIL 10. UG/R 96 111	U U U U U U U U U U U U U U U U U U U	15 90 PBLKKF 06LE0510- . SOIL 1. UG/	MB.
Aroclor-1254 Aroclor-1260 Dample Information Surrogate: Aroclor-1016 Aroclor-1221 Aroclor-1232	Cust ID: RFW#: Matrix: D.F.: Units: Tetrachloro-m-xylene Decachlorobiphenyl	15 15 312N52 005 MSD SOIL 1,0 UG/K 88 91	U U 30 3G *********************************	16 170 . J12N53 . 006 SOIL 1.0 UG/R	00 (G * fl	97 93 95 97 97 93 15	U	16 16 312N55 008 SOIL 1.0 UG/X	U U U G G * * U U	15 15 009 SOIL 10. UG/F 96 111 320 320 320	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	15 90 PBLKKF 06LE0510- SOIL 1. UG/	MB 000 KG
Aroclor-1254 Aroclor-1260 Dample Information	Cust ID: RFW#: Matrix: D.F.: Units: Tetrachloro-m-xylene Decachlorobiphenyl	15 15 312N52 005 MSD SOIL 1.0 UG/K 88 91	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	16 170 J12N53 .006 SOIL 1.0 UG/I	00 KG * * U	97 93 95 97 97 93 15 15	0 G \$ \$ =f1== U	16 16 312N55 008 SOIL 1.0 UG/K 110 102	U U C G * * * U U U	15 15 009 SOIL 10. UG/F 96 111 320 320 320 320	0 CG	15 90 PBLKKF 06LE0510- SOIL 1. UG/	MB 000 /KG
Aroclor-1254 Aroclor-1260 Dample Information Surrogate: Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242	Cust ID: RFW#: Matrix: D.F.: Units: Tetrachloro-m-xylene Decachlorobiphenyl	15 15 15 15 12N52 005 MSE SOIL 1.0 UG/K 88 91 85 15 15	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	16 170 J12N53 .006 SOIL 1.0 UG/3 105 103	00 CG * * fl== U	97 93 95 97 97 93 15	0 G ***f1==********************************	16 16 312N55 008 SOIL 1.0 UG/X	U U U G G * * U U	15 15 009 SOIL 10. UG/F 96 111 320 320 320	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	15 90 PBLKKF 06LE0510- SOIL 1. UG/	MB 000/KG

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U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. *= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC 8/23/6(

Report Date: 07/20/06 10:19

Lichville Laboratory, inc.

PCBs by GC

RFW Batch Number: 0606L291 Client: TNUHANFORD RC-020 K0438 Work Order: 11343606001 Page: 2

Cust ID: PBLKKF BS

Sample Information RFW#: 06LE0510-MB1

Matrix: SOIL

D.F.: 1.00

Units: UG/KG

Surrogate:	Tetrachloro-m-xylene Decachlorobiphenyl	68 91	ş Ş						•
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Aroclor-125	4	13	U			•			
Aroclor-126	0	106	¥		•		•	•	

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X 8/23/06

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation



Case Narrative

Client: TNU-HANFORD RC-020

LVL#: 0606L291

SDG/SAF # K0438/RC-020

W.O. #: 11343-606-001-9999-00 Date Received: 06-15-2006

PCB

Nine (9) soil samples were collected on 06-15-2006.

The samples and their associated QC samples were extracted on 06-20-2006 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedures on 07-06,10,11,20-2006. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8082.

The following is a summary of QC results accompanying the sample results. Lionville Laboratory Inc (LvLI) certifies that all test results meet the requirements of NELAC except as noted below:

- 1. Samples were extracted and analyzed within required holding time.
- 2. All sample results were reported on a dry-weight basis.
- 3. The samples and their associated QC samples received Copper-Sulfur and Sulfuric Acid cleanups according to Lionville Laboratory SOPs based on SW846 methods 3660A and 3665A respectively.
- 4. The method blank was below the reporting limits for all target compounds.
- 5. All surrogate recoveries were within acceptance criteria.
- 6. The blank spike recoveries were within acceptance criteria.
- 7. All matrix spike recoveries were within acceptance criteria.
- 8. Sample J12NC1 required a 10-fold dilution due to high concentration of target analytes.

 The reporting limits were adjusted to reflect the necessary dilution.
- 9. The initial calibrations associated with this data set were within acceptance criteria.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 1 1 pages.

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- 10. The continuing calibration standards analyzed prior to sample extracts were within acceptance criteria with the exception of CCVs analyzed on 07-10,11-2006 at 06:17 P.M and 02:01 A.M on the both columns. The data reflected an increase in instrument response, so the ability to identify the target compounds was not impaired. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
- 11. LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state accreditations. For a complete listing of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager.
- 12. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

Iain Daniels

Laboratory Manager

Lionville Laboratory Incorporated

som\r:\group\data\pest\tmu hanford\0606-291.pcbs

7/25/06

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Initiator Date:	711106	Batch: OGOGL: Samples: An		Parameter: Matrix:	901 06La 0510
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Re-	each			. •	· .
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_ 3	X Project Mgr. Stone/Johnson	····	GC/LC:	Kiger	
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Lionville Laboratory Sample Discrepancy Report (SDR #: DLCC 315

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Appendix 5

Data Validation Supporting Documentation

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VALIDATOR:	TLI	LAB:	LLI		DATE	}• •	8/20/	06
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echnical verificat omments: INSTRUI nitial calibrations ontinuing calibrat	MENT PERFORM acceptable?	IANCE AN	D CALIB	BRATIONS (LA	evels D an	đ E)	Yes	No N
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initial calibrations continuing calibrat	MENT PERFORM	IANCE AN	D CALIB	BRATIONS (L	evels D an	đ E)	Yes	No N No N No N
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3. BLANKS (Levels B, C, D, and E)		
Calibration blanks analyzed? (Levels D, E)		Yes No
Calibration blank results acceptable? (Levels D, E)		Yes No (N/A)
Laboratory blanks analyzed?		Yes No N/A
Laboratory blank results acceptable?		Yes No N/A
Field/trip blanks analyzed? (Levels C, D, E)		Yes No N/A
Field/trip blank results acceptable? (Levels C, D, E)	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Ye: No N/A
Transcription/calculation errors? (Levels D, E)		Yes No N/A
Comments:		
	<u> </u>	
	<u> </u>	
		·
4. ACCURACY (Levels C, D, and E)	•	_
Surrogates traceable? (I evels D. F.)		Yes No N/A
Surrogate recoveries acceptable?		
Surrogates traceable? (Levels D, E)		Yes No WA
Surrogates expired? (Levels D, E)		
MS/MSD samples analyzed?		
MS/MSD results acceptable?	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	(Yes) No N/A
MS/MSD results acceptable? MS/MSD standards NIST traceable? (Levels D, E)		Yes No (N/A
MS/MSD standards expired? (Levels D, E)	. p. s.	Yes No WA
LCS/BSS samples analyzed?		
LCS/BSS results acceptable?		/
Standards traceable? (Levels D, E)		
Standards expired? (Levels D, E)		
Transcription/calculation errors? (Levels D, E)		
Performance audit sample(s) analyzed?		7 1
Performance audit sample results acceptable?	1940441020240000000000000000000000000000	Yes No N/A
Comments:		NO PAS
	•	•

5. PRECISION (Levels C, D, and E)	•	<u></u>
Duplicate RPD values acceptable?		(Yes)No N/A
Duplicate results acceptable?	. 154 5 5 1 5 4 5 4 5 5 5 7 7 7 7 7 7 7 7 7 7 7 7 7	Ye No NA
MS/MSD standards NIST traceable? (Levels D, E)		Yes No (N/4)
MS/MSD standards expired? (Levels D, E)	***************************************	Yes No (N/A)
Field duplicate RPD values acceptable?		Yes NO NA
Field split RPD values acceptable?		Yes No (N/A)
Transcription/calculation errors? (Levels D, E)		Yes No (N/A)
Comments: FD = 1260 - RP	1 (po) 00/201e_	
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CUCTOM DEDECORMANCE (L		
6. SYSTEM PERFORMANCE (Levels D as	•	Yes No N/A
Chromatographic performance acceptable?		
Positive results resolved acceptably?		Yes No N/A
Comments:	:	<u> </u>
	,	
		
		•
7. HOLDING TIMES (all levels)	•	
Samples properly preserved?	·	Va. N/A
Sample holding times acceptable?		
Comments:	·	
Comments.		•
	· · · · · · · · · · · · · · · · · · ·	

levels) Compound identification acceptable? (Levels D, E)
Compound quantitation acceptable? (Levels D, E) Results reported for all requested analyses? Yes No N/ Results supported in the raw data? (Levels D, E) Samples properly prepared? (Levels D, E) Detection limits meet RDL? Transcription/calculation errors? (Levels D, E) Yes No N/ Yes No N/ Yes No N/
Results reported for all requested analyses? Results supported in the raw data? (Levels D, E)
Results supported in the raw data? (Levels D, E)
Samples properly prepared? (Levels D, E)
Detection limits meet RDL?
Transcription/calculation errors? (Levels D, E)
·
•
9. SAMPLE CLEANUP (Levels D and E)
Fluoricil ® (or other absorbent) cleanup performed?
Lot check performed?
Check recoveries acceptable? Yes No N/
GPC cleanup performed?
GPC check performed?Yes No N/
GPC check recoveries acceptable? Yes No N/
GPC calibration performed? Yes No N/
GPC calibration check performed?
GPC calibration check retention times acceptable?
Check/calibration materials traceable?
Check/calibration materials Expired?
Analytical batch QC given similar cleanup?
Transcription/Calculation Errors?
Comments:
,

Date:

23 August 2006

To:

Washington Closure Hanford Inc. (technical representative)

From:

TechLaw, Inc.

Project:

100BC Burial Grounds - Soil Full Protocol - Waste Site 120-B-1 Acid

Sump

Subject: \

Wet Chemistry - Data Package No. K0438-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. K0438 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date.	Media 🗼	Validation	
J12N48	6/13/06	Soil	С	See note 1
J12N49	6/13/06	Soil	С	See note 1
J12N50	6/13/06	Soil	С	See note 1
J12N51	6/13/06	Soil	С	See note 1
J12N52	6/13/06	Soil	С	See note 1
J12N53	6/13/06	Soil	С	See note 1
J12N54	6/13/06	Soil	С	See note 1
J12NC1	6/13/06	Soil	С	See note 1

^{1 -} Anions by 300.0, chromium VI by 7196A & pH by 9045C.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, Rev. 4, February 2005). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers

Appendix 2. Summary of Data Qualification

Appendix 3. Qualified Data Summary and Annotated Laboratory Reports

Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation

Appendix 5. Data Validation Supporting Documentation

Appendix 6. Additional Documentation Requested by Client

DATA QUALITY PARAMETERS

· Holding Times

Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within: 30 days for chromium VI; 28 days for bromide, chloride, fluoride and sulfate; 2 days for nitrate, nitrite and phosphate; and immediate for pH. 00001

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If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

Due to the holding time being exceeded by greater than twice the limit, all undetected nitrate, nitrite and phosphate results were rejected and flagged "UR".

Due to the holding time being exceeded by greater than twice the limit, all detected nitrate, nitrate and phosphate results were qualified as estimates and flagged "J".

Due to the holding time being exceeded by greater than twice the limit, all pH results were qualified as estimates and flagged "J".

All other holding times were acceptable.

Method Blanks

Method Blanks

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. All blank results must fall below the contract required detection limit (CRQL) to be acceptable.

All method blank results were acceptable.

Field (Equipment) Blank

No field blanks were submitted for analysis.

Accuracy

Matrix Spike and Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 70% to 130%. Samples with a recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a recovery of 30% to 69% and a sample result less than the IDL are

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qualified "UJ". Samples with a recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 130% and a sample result less than the IDL, no qualification is required.

All accuracy results were acceptable.

· Precision

Laboratory Duplicate Samples

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike duplicate (MSD) analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the CRDL and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All laboratory duplicate results were acceptable.

Field Duplicate

One set of field duplicates (J12N49/J12N50) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. The RPD for nitrite was outside QC limits (97%). Under the WCH statement of work, no qualification is required. All other field duplicate results were acceptable.

· Analytical Detection Levels

Reported analytical detection levels are compared against the required quantitation limits (RQLs) to ensure that laboratory detection levels meet the required criteria. All analytes met the RQL.

Completeness

Data package K0438 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 79%.

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MAJOR DEFICIENCIES

Due to the holding time being exceeded by greater than twice the limit, undetected nitrate, nitrite and phosphate results were rejected and flagged "UR". Rejected data is us unusable and should not be recorded.

MINOR DEFICIENCIES

The following minor deficiencies were noted:

- Due to the holding time being exceeded by greater than twice the limit, all detected nitrate, nitrite and phosphate results were qualified as estimates and flagged "J".
- Due to the holding time being exceeded by greater than twice the limit, all pH results were qualified as estimates and flagged "J".

Data flagged "J" indicates that the associated concentration is an estimate, but under the WCH statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

WCH, Contract #20266, Validation Statement of Work, Washington Closure Hanford Incorporated, July 7, 2003.

DOE/RL-96-22, Rev. 4, 100 Area Remedial Action Sampling and Analysis Plan, U.S. Department of Energy, February 2005.

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Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with WCH validation SOW are as follows:

- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- BJ Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.
- Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

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Appendix 2

Summary of Data Qualification

WET CHEMISTRY DATA QUALIFICATION SUMMARY*

SDG: K0438 [⊋] 1	ABEVIEWER	Project: 120-B4	
COMMENTS:		The state of the s	The Control of the Co
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Nitrate Nitrite Phosphate	UR	All undetected samples	Holding time
Nitrate Nitrite Phosphate	J	All detected samples	Holding time
рН	J	All	Holding time

^{* -} The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: WASHING	TON CLOS	SURE HA	NFC	ORD]											
Lab: LLI	SDG: I	K0438												_			
Sample Number		J12N48		J12N49		J12N50		J12N51		J12N52		J12N53		J12N54		J12NC1	1
Remarks						Duplicate		<u> </u>									
Sample Date	-	6/15/06		6/15/06		6/15/06		6/15/06		6/15/06		6/15/06		6/15/06		6/15/06	
Wet Chemistry	RQL	Result	Q	Result	a	Result	a	Result	Q	Result	Q	Result	Q	Result	Q	Result	
Bromide		2.5	U	2.5	U	3.0	U	2.9	U	2.4	ט	3.2	υ	2.8	U	127	┺
Chloride		4.1		2.5	U	3.0	U	2.9	Ū	2.4	כ	3.2	υ	2.8		260	_
Fluoride		2.5	U	2.5	υ	3.0		2.9	U	3.8		6.4	_	2.8	_	127	
Nitrate	_	2.54	UR	2.55	ÜR	3.03	UR	2.86	UR	2.40	UR				—	└─	UR
Nitrite		2.54	UR	12.7	J	4.37	J_	2.86	UR	3.10	J	18.9		3.16		141	-
Phosphate		2.5	UR	7.6	J	11.1	J	7.1	J	2.4	UR						UR
Chromium VI	0.5	0.36		0.24	Ū	0.34		0.27		0.36	<u> </u>	0.30	_	0.38	_	0.61	
Sulfate	5	293	Π	122	Π	143		1890		126		5960	乚	77.5		177000	
pН	\neg	10	J	8.5	J	9.2	J	8.1	J	7.8	J	6.6	J	6.2	IJ_	2.5	IJ

INORGANICS DATA SUMMARY REPORT 07/14/06

CLIENT: INJHANFORD RC-020 K0438 WORK ORDER: 11343-606-001-9959-00-

LVL LOT #: 06061291

,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		•	•		REPORTING.	DILUTION
SAMPLE	SITE ID	ANALYTE	result	UNITS	LIMIT	PACTOR
	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				-450641222	*******
-001	J12N48	* Solida	89.8	ŧ	0.01	1.0
	•	Bromide by IC	2.5 u	MG/KG	2.5	1.0
		Chloride by IC	4.2	HG/KG	2.5	1.0
		Pluoride by IC	2.5 u	MG/KG	2.5	1.0
	•	Nitrite by IC	, 2.54 u	Zwa/xa	2.54	1.0
		Nitrate by IC	2.54 u	MG/KG	2.54	1.0
		Phosphate by IC	2.5 uf	2 MG/303	2.5	1.0
	•	Chromium VI	. 0.36	MG/KG	0.22	1.0
•		Sulfate by IC	293 _.	MG/KG	12.7	5.0
		рн	10 J	SOIL PH	0.01	1.0
-002	J12N49	* Solids	81.8	ŧ	0.01	1.0
<b>45</b> 2		Bromide by IC	2.5 u	MG/XG	2.5	1.0
		Chloride by IC	2.5 u	MG/KG	2.5	1.0
	•	Fluoride by IC .	2.5 u	MG/KG	2.5	1.0
		Nitrite by IC .	2.55 u	_MG/KG	2.55	. 1.0
		Nitrate by IC	12.7 五	HG/KG	2.55	1.0
	•	Phosphate by IC	7.6 J	MG/KG	2.5	1.0
•		Chromium VI	0.24 u	MG/KG	0.24	1.0
		Sulfate by IC	122	MG/KG	5.1	2.0
		на .	. 8.5 J	SOIL PH	0.01	1,0
-003	J12N50	t Solids	87.2	<b>.</b>	0.01	1.0
	•	Bromide by IC	3.0 u	MG/KG	3.0	1.0
		Chloride by IC	3.0 u	MG/KG	3.0	1.0
		Pluoride by IC	3.0 u	MG/KG	3.0	1.0
		Nitrite by IC	3.03 u	MG/XG	3.03	1.0
		Nitrate by IC	4.37 I	MG/KG	3.03	1.0
		Phosphate by IC	11.1 T	MG/303	3.0	1.0
		Chromium VI	0.34	MG/KG	0.23	1.0
	•	Sulfate by IC	143	MG/KG	6.2	2.0
		рн	9.2 J	SOIL PH	0.01 4	1.0

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#### INORGANICS DATA SUMMARY REPORT 07/14/06

CLIENT: INUHANFORD RC-020 K0438 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0606L291

Sample	SITE ID	ANALYTE	RESULT	UNITS	reporting Limit	DILUTION DILUTION
		******************		*****	********	
-004	J12N51	* Solids	85.3	•	0.01	1.0
		Bromide by IC	2.9 u	-	2.9	1.0
		Chloride by IC	2.9 u	MG/KG	2.9	1.0
		Fluoride by IC	2.9 u	MG/XG	2.9	1.0
	•	Nitrite by IC	7.86 u	LHG/KG	2.86	1.0
		Nitrate by IC	2.86 uj		2.86	1.0
	• •	Phosphate by IC	7.1 I	MG/XG	2.9	1.0
•		Chromium VI	0.27	MG/XG	0.23	1.0
	•	Sulfate by IC	1890	MG/103 ·	143	50.0
		ън .	8.1 J	SOIL PH	0.01	1.0
-005	J12N52 .	% Solids	89.5		0.01	· i.o
	•	Broaide by IC	2.4 u	MG/KG	2.4	1.0
	•	Chloride by IC		MG/KG	2.4	1.0
		Fluoride by IC	3.8	MG/KG	2.4	1.0
•		Nitrite by IC		MG/KG	2.40	1.0
		Nitrate by IC	3.10 🗓		2.40	1.0
	•	Phosphate by IC	. 2.4 up		2.4	1.0
		Chromium VI	0.36	MG/KO	0.22	1.0
•	•	Sulfate by IC	126	MG/KG	12.0	5.0
		pH	7.8 I	SOIL PH		1,0
-006	J12N53	* Solids	81.9		0.01	1.0
		Bromide by IC	3.2 u	MG/KG	3.2	1.0
		Chloride by IC	3.2 ່ ບ	MG/XG	3.2	1.0
		Fluoride by IC	6.4 u	MG/KG	6.4	2.0
		Nitrite by IC	3.22 uZ	.MG/KG	3.22	1.0
		Nitrate by IC	18.9 🗓	MG/KG	3,22	1.0
		Phosphate by IC	3.2 ul	MG/KG	3.2	1.0
		Chromium VI	0.30	MG/KG	0.24	1.0
		Sulfate by IC	5960	MG/KG	159	50.0
		pН	6.6 J	SOIL PH	0.01	1.0

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## INORGANICS DATA SUMMARY REPORT 07/14/06

CLIENT: TMINIANFORD RC-020 K0438 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0606L291

					REPORTING	DILUTION
SAMPLE	SITE ID	ANALYTE .	result	Units	LIMIT .	PACTOR
	v	***************************************	*****			
-007	J12N54	t Solids ·	8.8	*	. 0.01	1.0
		Bromide by IC	2.8 u	MG/KG	2.8	1.0
	•	Chloride by IC	2.8 u	MG/KG	2.8	1.0
•		Fluoride by IC	2.8 u	MG/KG	2.8	1.0
		Nitrite by IC	2.84 u i	CMC/KG	2.84	1.0
	•	Nitrate by IC	3.16 3	MG/KG	2.84	1.0
•	•	Phosphate by IC	2.8 u	ZMG/KG	2.8	1.0
		Chromium VI	0.38	MG/XG	0,22	1.0
•		Sulfate by IC	77.5	MG/KG	2.8	1.0
		рH	6.2 J	SOIL PH	ó.c1	1.0
-008	J12N55	t Solids	100	*	0.01	1.0
-009	J12NC1 .	t Solids	41,3	¥	0.01	1.0
		Bromide by IC	127 u	MG/XG	127	20.0
		Chloride by IC	260	MG/KG	127	20.0
		Fluoride by IC	127 u	MG/KG	127	20.0
		Nitrite by IC		CMG/XO	127	20.0
		Nitrate by IC	141 🎜	MG/XQ	127	20.0
		Phosphate by IC	127 u1	P.MG/KO	127	20.0
		Chromium VI	0.61	HG/KG	0.48	1.0
		Sulfate by IC	177000	MG/XG	6360	1000
	•	рн	2.5	SOIL PH	0.01	1.0

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation



## Analytical Report

Client: TNU-HANFORD RC-020 K0438

LVL#: 0606L291

W.O.#: 11343-606-001-9999-00 Date Received: 06-15-06

> 7/17/06 Date

### INORGANIC NARRATIVE

1. This narrative covers the analyses of 9 soil samples.

2. The samples were prepared and analyzed in accordance with the methods checked on the attached glossary.

LvLI is NELAP accredited by the state of Pennsylvania and holds over 20 additional state accreditations. For a complete list of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager. LvLI certifies that all test results meet the requirements of NELAC with any exception noted in the following statements.

Elevated reporting limits for Bromide, Fluoride, Nitrate and Phosphate are the result of the necessity to dilute the samples to diminish co-elution effects as well as matrix interferences.

- 3. Sample holding times as required by the method and/or contract were met.
- 4. The results presented in this report are derived from samples that met LvLI's sample acceptance policy.
- 5. The method blanks were within the method criteria.
- 6. The Laboratory Control Samples (LCS) were within the laboratory control limits.
- 7. The matrix spike recoveries for Bromide, Chloride, Fluoride, Nitrite, Nitrate, Phosphate, Chromium VI and Sulfate were within the 75-125% control limits.
- 8. The replicate analyses for Bromide, Fluoride, Nitrite, Nitrate, Phosphate, Sulfate and pH were within the 20% Relative Percent Difference (RPD) control limit however replicate analyses for Chloride and Chromium VI were outside the control limit that may be attributed to sample inhomogeneity.
- 9. Results for solid samples are reported on a dry weight basis.
- 10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Iain Dahiels

Laboratory Manager

Lionville Laboratory Incorporated

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The results presented in this report relate to the analytical testing and conditions of the samples upon receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 18 pages.

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06/15/06 DATE RECEIVED:

			•			al dipier co		
CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS		
J12N48	•				·			
						•		
* SOLIDS	001	S	06L%S068	06/15/06	06/19/06	06/20/06		
BROMIDE BY IC	001	S	06LICE62	06/15/06	06/28/06	06/28/06		
BROMIDE BY IC	001 REP	·s	06LICE62	06/15/06	06/28/06	06/28/06		
BROMIDE BY IC	001 MS	S	06LICE62	06/15/06	06/28/06	06/28/06		
CHLORIDE BY IC	001	3	06LICE62	06/15/06	06/28/06	06/28/06		
CHLORIDE BY IC	001 REP	s	06LICE62	06/15/06	06/28/06	06/28/06		
CHLORIDE BY IC	001 MS	S	06LICE62	06/15/06	06/28/06	06/28/06		
FLUORIDE BY IC	001	S	06LICE62	06/15/06	06/28/06	06/28/06		
FLUORIDE BY IC	001 REP	s	06LICE62	06/15/06	06/28/06	06/28/06		
FLUORIDE BY IC	001 MS	S	06LICE62	06/15/06	06/28/06	06/28/06		
NITRITE BY IC	001	S	06LICE62	06/15/06	06/28/06	06/28/06		
NITRITE BY IC	001 REP	S	06LICE62	06/15/06	06/28/06	06/28/06		
NITRITE BY IC	001 MS	S	06LICE62	06/15/06	06/28/06	06/28/06		
NITRATE BY IC	001	S	06LICE62	06/15/06	06/28/06	06/28/06		
NITRATE BY IC	001 REP	S	06LICE62	06/15/06	06/28/06	06/28/06		
NITRATE BY IC	001 MS	S	06LICE62	06/15/06	06/28/06	06/28/06		
PHOSPHATE BY IC	001	S	06LICE62	06/15/06	06/28/06	06/28/06		
PHOSPHATE BY IC	001 REP	·s	06LICE62	06/15/06	06/28/06	06/28/06		
PHOSPHATE BY IC .	001 MS	S	06LICE62	06/15/06	06/28/06	06/28/06		
CHROMIUM VI	001	S	06LVI062	06/15/06	06/29/06	06/29/06		
CHROMIUM VI	OOL REP	S	06LVI062	06/15/06	06/29/06	06/29/06		
CHROMIUM VI	001 MS	s	06LVI062	06/15/06	06/29/06	06/29/06		
CHROMIUM VI	001 MSD	S	06LVI062	06/15/06	06/29/06	06/29/06		
SULFATE BY IC	001	S	06LICE62	06/15/06	06/28/06	06/28/06		
SULFATE BY IC	001 REP	S	06LICE62	06/15/06	06/28/06	06/28/06		
SULFATE BY IC	001 MS	S	06LICE62	06/15/06	06/28/06	06/28/06		
PH	001	S	06TbH03e	06/15/06	06/16/06	06/16/06		
J12N49					•			
% SOLIDS	002	ន	06L%S068	06/15/06	06/19/06	06/20/06		
BROMIDE BY IC	002	S	06LICE62	06/15/06	06/28/06	06/28/06		
CHLORIDE BY IC	002	Ş	06LICE62	06/15/06	06/28/06	06/28/06		
FLUORIDE BY IC	002	S	06LICE62	06/15/06	06/28/06	06/28/06		
NITRITE BY IC	002	. S	06LICE62	06/15/06	06/28/06	06/28/06		

DATE RECRIVED: 06/15/06 LVL LOT # :0606L291

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
NITRATE BY IC	002	s	06LICE62	06/15/06	06/28/06	06/28/06
PHOSPHATE BY IC	002	S	06LICE62	06/15/06	. 06/28/06	06/28/06
CHROMIUM VI	002	S	06LVI062	06/15/06	06/29/06	06/29/06
SULFATE BY IC	002	S	06LICE62	06/15/06	06/28/06	06/28/06
PH ·	002	S	06LPH036	06/15/06	06/16/06	06/16/06
J12N50	` `			•	•	
* SOLIDS	003	s	06L%5068	06/15/06	06/19/06	06/20/06
BROMIDE BY IC	003	S	06LICE62	06/15/06	06/28/06	06/28/06
CHLORIDE BY IC	003	S	06LICE62	06/15/06	06/28/06	06/28/06
FLUORIDE BY IC	003	S	06LICE62	06/15/06	06/28/06	06/28/06
NITRITE BY IC	003	S	06LICE62	06/15/06	06/28/06	06/28/06
NITRATE BY IC	003	ន	06LICE62	06/15/06	06/28/06	06/28/06
PHOSPHATE BY IC	003	S	06LICE62	06/15/06	06/28/06	06/28/06
CHROMIUM VI .	003	S	06LVI062	06/15/06	06/29/06	06/29/06
SULFATE BY IC	003	S	06LICE62	06/15/06	06/28/06	06/28/06
PH .	003	s	06TbH036	06/15/06	06/16/06	06/16/06
J12N51		•			•	
* SOLIDS	004 .	s.	06L1S068	06/15/06	06/19/06	. 06/20/06
BROMIDE BY IC	004	S	06LICE62	06/15/06	06/28/06	06/28/06
CHLORIDE BY IC	004	s	06LICE62	06/15/06	06/28/06	06/28/06
FLUORIDE BY IC	004	S	06LICE62	06/15/06	06/28/06	06/28/06
NITRITE BY IC	004	S	06LICE62	06/15/06	06/28/06	06/28/06
NITRATE BY IC	004	S	06LICE62	06/15/06	06/28/06	06/28/06
PHOSPHATE BY IC	004	្ន	06LICE62	06/15/06	06/28/06	06/28/06
CHROMIUM VI	004	S	06LVI062	06/15/06	06/29/06	06/29/06
SULFATE BY IC	004	S	06LICE62	06/15/06	06/28/06	06/28/06
PH	004	S	06LPH036	06/15/06	06/16/06	06/16/06
J12N52	•					
* SOLIDS	005	s	06L%S068	06/15/06	06/19/06	06/20/06
BROMIDE BY IC	005	S	06LICE62	06/15/06	06/28/06	06/28/06
CHLORIDE BY IC	005	S	06LICE62	06/15/06	06/28/06	06/28/06
FLUORIDE BY IC	005	S	06LICE62	06/15/06	06/28/06	06/28/06
						•

DATE RECEIVED: 06/15/06 LVL LOT # :0606L291 CLIENT ID /ANALYSIS LVL # MTX PREP # COLLECTION EXTR/PREP ANALYSIS NITRITE BY IC 005 S 06LICE62 06/15/06 06/28/06 06/28/06 005 06/28/06 NITRATE BY IC S 06LICE62 06/15/06 06/28/06 PHOSPHATE BY IC 06/15/06 06/28/06 005 S 06LICE62 06/28/06 CHROMIUM VI 005 06/15/06 06/29/06 S 06LVI062 06/29/06 005 06/15/06 06/28/06 06/28/06 SULFATE BY IC S 06LICE62 06/15/06 06/16/06 PH 005 06LPH036 06/16/06 J12N53 06/19/06 * SOLIDS 006 S 06L%S068 06/15/06 06/20/06 06/15/06 06/28/06 BROMIDE BY IC 900 S 06LICE62 06/28/06 CHLORIDE BY IC 006 06/28/06 S 06LICE62 06/15/06 06/28/06 FLUORIDE BY IC 006 S 06LICE62 06/15/06 06/28/06 06/28/06 006 06LICE62 06/15/06 06/28/06 NITRITE BY IC 06/28/06 NITRATE BY IC 006 S 06LICE62 06/15/06 06/28/06 06/28/06 PHOSPHATE BY IC 006 S 06LICE62 06/15/06 06/28/06 06/28/06 06/15/06 CHROMIUM VI 006 S 06LVI062 06/29/06 06/29/06 06/15/06 SULFATE BY IC 006 S 06LIC063 07/03/06 07/03/06 06/15/06 PH 006 S 06LPH036 06/16/06 06/16/06 J12N54 06/15/06 % SOLIDS . 007 06L%S068 06/19/06 06/20/06 S BROMIDE BY IC 007 S 06LICE62 06/15/06 06/28/06 06/28/06 CHLORIDE BY IC 06/15/06 06/28/06 007 S 06LICE62 06/28/06 FLUORIDE BY IC 06/15/06 007 S 06LICE62 06/28/06 06/28/06 NITRITE BY IC 007 3 06LICE62 06/15/06 06/28/06 . 06/28/06 NITRATE BY IC 007 S 06LICE62 06/15/06 06/28/06 06/28/06 06/15/06 PHOSPHATE BY IC 007 S O6LICE62 06/28/06 06/28/06 CHROMIUM VI 06/15/06 06/29/06 007 S 06LVI062 · 06/29/06 SULFATE BY IC 007 06/15/06 06/28/06 S 06LICE62 06/28/06 PH 007 06LPH036 06/15/06 06/16/06 06/16/06 J12N55 * SOLIDS 008 06L%S068 06/19/06 06/15/06 06/20/06 J12NC1

* SOLIDS

009

医多形性皮肤 医多种甲状腺 化苯

06L%S068

06/15/06

物大编队的复数形式 水土

06/19/06

06/20/06

DATE RECEIVED: 06/1	5/06		LVL LOT # :0606L291				
CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	analysis	
	·			06/15/06	07/03/06	07/03/06	
BROMIDE BY IC	009	S	06LIC063	06/15/06 06/15/06	07/03/06	07/03/06	
CHLORIDE BY IC	009	S	06LIC063	06/15/06	07/03/06	07/03/06	
FLUORIDE BY IC	009	S	06LIC063		07/03/06	07/03/06	
NITRITE BY IC	009	S	06LIC063	06/15/06 06/15/06	07/03/06	07/03/06	
NITRATE BY IC	009	S	06LIC063		07/03/06	07/03/06	
PHOSPHATE BY IC	009	S	06LIC063	06/15/06	06/29/06	06/29/06	
CHROMIUM VI	009	S	06LVI062	06/15/06		07/03/06	
SULFATE BY IC	009	, S	06LIC063	06/15/06	07/03/06	06/16/06	
PH	009	Š	06LPH036	06/15/06	06/16/06		
PH .	009 REP	. S	06LPH036	06/15/06	06/16/06	06/16/06	
LAB QC:	•	_				•	
<del></del>		•		•	•	•	
		•	•		•		
			:		•	٠.	
BROMIDE BY IC	MB1	S	06LICE62	N/A	06/27/06	06/27/06	
BROMIDE BY IC	MB1 BS	S	06LICE62	N/A	06/27/06	06/27/06	
CHLORIDE BY IC	MB1	· S	06LICE62	N/A	06/27/06	06/27/06	
CHLORIDE BY IC	MB1 BS	S	06LICE62	N/A	06/27/06	06/27/06	
FLUORIDE BY IC	MB1	3	06LICE62	N/A	06/27/06	06/27/06	
FLUORIDE, BY IC	MB1 BS	S	06LICE62	N/A	06/27/06	06/27/06	
NITRITE BY IC	MB1	S	06LICE62	N/A	06/27/06	06/27/06	
NITRITE BY IC	MB1 BS	S	06LICE62	N/A	06/27/06	06/27/06	
NITRATE BY IC	MB1	S	06LICE62	N/A	06/27/06	06/27/06	
NITRATE BY IC	MB1 BS	3	06LICE62	n/a	06/27/06	06/27/06	
PHOSPHATE BY IC	MB1	S	O6LICE62	N/A	06/27/06	06/27/06	
PHOSPHATE BY IC	MB1 BS	S	06LICE62	N/A	06/27/06	06/27/06	
CHROMIUM VI	MB1	, s	06LVI062		06/29/06	06/29/06	
CHROMIUM VI	MB1 BS	S	06LVI062	N/A	06/29/06	06/29/06	
CHROMIUM VI	MB1 BSD	S	06LVI062	N/A	06/29/06	06/29/06	
SULFATE BY IC	MB1	\$	06LICE62	N/A	06/27/06	06/27/06	
SULFATE BY IC	MB1 BS	S	06LICE62	N/A	06/27/06	06/27/06	
SULFATE BY IC	MB1	ន	06LIC063	N/A	07/03/06	07/03/06	
SULFATE BY IC	MB1 BS	S	06LIC063	N/A	07/03/06	07/03/06	
BROMIDE BY IC	MB1	S	06LIC063	N/A	07/03/06	07/03/06	
BROMIDE BY IC	MB1 BS	S	06LIC063	N/A	07/03/06	07/03/06	
CHLORIDE BY IC	MB1	S	06LIC063	N/A	07/03/06	07/03/06	
CHLORIDE BY IC	MB1 BS	S	06LIC063	N/A	07/03/06	07/03/06	
FLUORIDE BY IC	MB1	· s	06LIC063	N/A	07/03/06	07/03/06	
FLUORIDE BY IC	MB1 BS	S	06LIC063	N/A	07/03/06	07/03/06	

DATE RECEIVED: 06/15/06

LVL LOT # :0606L291

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
NITRITE BY IC	MB1	- <u></u>	06LIC063	N/A	07/03/06	07/03/06
NITRITE BY IC	MB1 BS	Š	06LIC063	N/A	07/03/06	07/03/06
NITRATE BY IC	MB1	S	06LIC063	N/A	07/03/06	07/03/06
NITRATE BY IC	MB1 BS	S	06LIC063	N/A	07/03/06	07/03/06
PHOSPHATE BY IC	MB1	S	06LIC063	N/A	07/03/06	07/03/06
PHOSPHATE BY IC	MB1 BS	S	06LIC063	N/A	07/03/06	07/03/06

C. Martinez/D Bowers  Protect Designation 100-BC Durial Grounds - Soil Full Protocol 100-BC - 120-B-1 acid sump 100-BC Durial Grounds - Soil Full Protocol 100-BC - 120-B-1 acid sump 100-BC Durial Grounds - Soil Full Protocol 100-BC - 120-B-1 acid sump 100-BC Durial Grounds - Soil Full Protocol 100-BC - 120-B-1 acid sump 100-BC Durial Grounds - Soil Full Protocol 100-BC - 120-B-1 acid sump 100-BC Durial Grounds - Soil Full Protocol 100-BC - 120-B-1 acid sump 100-BC - 120-B-1 acid sump 100-BC Durial Grounds - Soil Full Protocol 100-BC - 120-B-1 acid sump 110-BC Durial Grounds - Soil Full Protocol 100-BC - 120-B-1 acid sump 110-BC Durial Grounds - Soil Full Protocol 100-BC - 120-B-1 acid sump 110-BC - 120-B-1 acid sump 110-BC - 120-BC Durial Full Protocol 110-BC Durial Full Protocol 110-BC - 120-BC Durial Full Protocol 110-BC Du	eta Turnaround	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST RC-020-016   RC-							<u> </u>	EHAMOIG	Washington Closus				
Shinned To			Price Code	nator											
Shinned To	days	14 g	Air Quality						ρ			I Full Protocol			
Shinned To FIDERLINE SERVICES LIONYILLE  POSSIBLE SAMPLE HAZARDS/REMARKS  Iow pil  Preservation  Special Handling and/or Storage  No. of Container is  No. of Container is  No. of Container is  Sample No.  SAMPLE ANALYSIS  Sample No.  Matrix * Sample Date Sample Time  Sample No.  Matrix * Sample Date Sample Time  Sample No.  Matrix * Sample Date Sample Time  No. of Container is  Sample No.  Matrix * Sample Date Sample Time  No. of Container is  Sample No.  Matrix * Sample Date Sample Time  No. of Container is  Sample No.  Matrix * Sample Date Sample Time  No. of Container is  Sample No.  Matrix * Sample Date Sample Time  No. of Container is  Sample No.  No. of Container is  No. of Container is  Sample No.  No. of Container is  Sample No.  No. of Container is  Sample No.  No. of Container is  No. of Container is  No. of Container is  Sample No.  No. of Container is  No. of Container	\			meat			000	CQA R120B120				052	Ice Chest No. TNU		
Preservation		OSPC	No. See 0.	Air Bill	Bill of Lading/			07	605	Property No. AO	Offsite	C1			
Special Handling and/or Storage   Type of Container   aG   aG   aG   aG   aG   aG   aG   a						Cool 40	Cool 4C	Cool 4C	None	Preservation		POSSIBLE SAMPLE HAZARDS/REMARKS			
None 7724 6-14-0 6    Cod   You   Volume   230mL   120mL   120					-	aG	aG	aG	aG			<b>.</b>	•		
Sample No.   Matrix *   Sample Date   Sample Time   Sample Time   Sample No.   Matrix *   Sample Date   Sample Time   Sample Time   Sample No.   Matrix *   Sample Date   Sample Time	·					1.	l	I	1	No. of Container(s)			HORE TRR 6-14-		
Sample No.   Matrix *   Sample Date   Sample Time				•		120mL	120mL	120mL	250mL	Volume			Cost 40C		
J12N48   SOIL   13/6以   130   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/3   13/					4 1 '	300 B, p	PCBs - 8082		Special		.YSIS	Sample anai	00023		
J12N50 SOIL 1210  J12N51 SOIL 1210  J12N52 SOIL 66 13 06 125  CHAIN OF POSSESSION  Relinquished By/Renoved From Date/Time 1500 Received By/Stored In 28 Date/Time 1300 Run Sulfate analysis on available material. EPA mediod 300 0	7-8 G08	Allege by English	\$76 87 40 S. 166.	5 L 3 L		Car Carlo		1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	7.25	Sample Time	Sample Date	Matrix •	Sample No.		
J12N50 SOIL 1210  J12N51 SOIL 1250  J12N52 SOIL 66/13/06 1255  CHAIN OF POSSESSION Sign/Print Names SPECIAL INSTRUCTIONS Relinquished By/Remayed From Date/Time 1500 Received By/Stored In 28 Date/Time 1300 Run Sulfate analysis on available material. EPA mediod 300 0		· .	·			/	)	)	7	1205	00/13/06	SOIL	J12N48		
J12N51 SOIL 1350  J12N52 SOIL 66 13 06 1255  CHAIN OF POSSESSION Sign/Print Names SPECIAL INSTRUCTIONS Relinquished By/Ronqved From Date/Time 1500 Received By/Stored Is 28 Date/Time 130 Run Sulfate analysis on available material. EPA mediod 300 0						7		)	-~-	1235		SOIL	J12N49		
U12N52 SOIL 66 13/06 1255  CHAIN OF POSSESSION Sign/Print Names SPECIAL INSTRUCTIONS Relinquished By/Ronqved From Date/Time 1500 Received By/Stored Is 28 Date/Time 1500 Run Sulfate analysis on available material. EPA mediod 300 0						7	7	7	<u> </u>	1240		SOIL	J12N50		
CHAIN OF POSSESSION Sign/Print Names SPECIAL INSTRUCTIONS Relimquished By/Romoved From Date/Time 1500 Received By/Stored In 203 Date/Time 1500 Received By/Stored By/Stor						)	7	~		1250	<u> </u>	SOIL.	J12N51		
Relinquished By/Renoved From Date/Time 1850 Received By/Stored In 28 Date/Time 130 Run Salfate analysis on available material. EPA method 300 0						7	)	/	7	1255	66/13/06	SOIL	J12N52		
lan 11 10 du 75 4 lalor 1273 4 Res 76 1210	Matrix			<del>* · · · · · · · · · · · · · · · · · · ·</del>	4\$	UCTIO	CIAL INSTR	SPE					CHAIN OF POSSESSI		
Relimpuished By Removed From Questime Received By Copper, Iron, Caronium, Cobalt, Copper, Iron, Lead, Marganess, Molybden	Resimpuished By/Removed From Date/Time 1830 Received By/Stored is 28 Date/Time 1830 Run Sulfate analysis on available trasterial. EPA mediod 300 0  CWC 1: NC 2 C 176 Fig. a CU 13 06  Received By/Stored is 28 Date/Time   Store   St														
Reproduct to the Contract of the Contract of Contract	Ar-Air DSDrown DLDrown YElevan U, in Wigne L-d. aquid VL aputal		·						Me/Ture	6-15-d	Refugu shed its Description Date Tune Received by Shared in				
Relinquished By-Removed From Date-Time Received By-Stood In Date: Fine  Relinquished By-Removed From Date-Time Received By-Stated In Date-Time Personnel not available to relinquish samples from 3728  Relinquished By-Removed From Date-Time Received By-Stated In Date-Time Relinquish samples from 3728	)-Care		• *		3728	ples from	clinquish sam	— r							
	ine	Date/Time	· .					<u> </u>	Ti		<del></del>	iy .			
	ine	Date/Time	<del></del>			acd By	Dispo		•			Icitual	FINAL SAMPLE Disposal A		

ſ	Washington Closur	c Hanford	C	HAIN OF CUST	ODY/SA	MPLE ANALYSIS REQUEST RC-020-016 Page - 01						DI 4 .		
	Cullector C', Martinez/D Ikmers	•	Comp	any Contact ig Bowers	Telephon 509-53	e No.			Prolect Coordin KESSNER. JH	alor	Price Code	•	Data Turi	~ ~
	Project Designation 100-BC Burial Grounds - Sail	Full Protocol		ling Lucation BC = 120-B-1 acid sum	Р		· ·		RC-020		Alr Quality	·	14 da	90001
	ice Clicsi No. TNU-			Logbuuk No. L 1173-8		COA R120B120	00		lethod of Ships FED EX	•			•	966
	Shinned To EBERLINE SERVICES (130		Offsit	e Property No. AC	1605	707			Bill of Lading/	Lir Bill !	No. Se	ie 05	spc.	ເວ   ເ
	POSSIBLE SAMPLE HAZA low pli	Preservation	None	Coul 4C	Coul 4C	Cool 4C								
	:			Type of Container	aG .	₩G	»G	aG		•				
	Special Handling and/or S	itorage -	•	No. of Container(s)	. 1	1.	. 1	1	•					
	E140c	•		Volume	250mL	120aiL	120mL	120ml	•	•				
	00022		See item (1) in Special Instructions	Chromient Hex = 7196	PC84 - 2062	IC Anom 300.0, p (Sail) + 90	н		:					
	, Sample No.	Matrix *	Sample Date	Sample Time	.T ,	1.7.30			24 55.24 57	A SEA	18 12 712	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	<b>14.</b> (A)	g(1.54%);
b	J12N53	SOIL	06/13/06	1305	7.	1	1-1-	<u>~</u>	•					
7	J12N54	SOIL	(	1315	~ ·	<u> </u>	<u>                                     </u>	7	•	<u> </u>	<u> </u>			<u>  ·                                     </u>
8	J12N55	SOIL		1215	,	TREINS	4 . •	TRE	19-9			<u> </u>	<u> </u>	<u> </u>
9	J12NC1	SOIL	86/13/00	. 1420	7		7	7	•				<del> </del>	<del>                                     </del>
	Relinquished By Removed From Relinquished By Removed From	Date Time  Date Time  Date Time  Date Time  Date Time  Date Time  Date Time	Received By/S  Received By/S  Received By/S  Received By/S	System de ser o constitue de 140 constitue de 140 constitue de 150 constit	Oute/Time  Oute/Time  Oute/Time	Run (t) I Cade Nick	CP Metals • 601 nium. Calcium. 1	on availai (O (Chent Chromium elenium vailable nles from	ble material. EPA ( List) (Aluminum.  1. Cubalt. Copper.  Silicon, Silver. Sod  to  13728	Antimony Iron, Lead	. Arsenic. Banum 1. Magnesium, Ma	nsganese. Moly	Judenum.	Mairix a  8-Seli SE-Scaliment SO-Selid SI-Straige W o Water O-Chi A-Aur DS-Orrow Solde VL-NOvom Lepuck ToTioner NY-Wipe Le-Lispid V-V-spectatron V-Chief
•	LABORATORY Received I	By					<del> </del>						Date/Time	<u> </u>
	FINAL SAMPLE Disposal I	Method					Dupo	wed By					SAME FAIR	
	DULL ELLOYA (DODOCOOL)													•

Appendix 5

**Data Validation Supporting Documentation** 

## GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	В	(c)	D	E			
PROJECT:	20-B-1		DATA PACKAG	e: K043	8			
VALIDATOR:	TLI	LAB: LLI	<u> </u>	DATE: 8	20/00			
			SDG:	K0438				
		ANALYSES	PERFORMED					
Anions/IC	TOC .	тох	TPH-418.1	Oil and Grease	Alkalinity			
Ammonia	BOD/COD	Chloride	Chromium-VI	pН	NO ₂ /NO ₂			
Sulfate	TDS	TKN	Phosphate					
SAMPLES/MAT	RIX	· .						
JIZNA	y T12	N49 :	JIZNZO	J12 W51				
T12NS			J12254	JIZUCI				
				V.1.				
			•					
	· · · · · · · · · · · · · · · · · · ·			•	5011			
<u>.</u>	•	•			· · · · · · · · · · · · · · · · · · ·			
1. DATA P.	ACKAGE COMPI	ETENESS AND	CASE NARRATIV	'E	<b>.</b> .			
	ion documentation				Yes No N/A			
Comments:								
·	<u> </u>	· ·		• . 	<del> </del>			
			· · · ·	<del></del>	<del></del>			
	•				•			
	MENT PERFORM				$\sim$			
	-				Yes No N/A			
Initial calibrations	acceptable?	***************************************		***************************************	Yes No/N/A			
ICV and CCV che	cks performed on a	l instruments?		***************************************	Yes No N/A			
ICV and CCV che	cks acceptable?		.4.4,51.10.200.200.00000000000000000000000000	***************************************	Yes No N/A			
Standards traceabl	e?	**************************	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		Yes No N/A			
Standards expired?	Standards expired?							
Calculation check	Calculation check acceptable?Yes Nd N/A							
Comments:	<del></del>	<del></del>	·	<del></del>	$\overline{}$			
• •		•						

## GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)	
ICB and CCB checks performed for all applicable analyses? (Levels D,	E) Yes No WA
ICB and CCB results acceptable? (Levels D, E)	
Laboratory blanks analyzed?	Yes No N/A
Laboratory blank results acceptable?	Yds No N/A
Field blanks analyzed? (Levels C, D, E)	Yes (No) N/A
Field blank results acceptable? (Levels C, D, E)	Yes No WA
Transcription/calculation errors? (Levels D, E)	Yes No NA
Comments:	No FB
	· .
	•
4. ACCURACY (Levels C, D, and E)	
Spike samples analyzed?	Yes No N/A
Spike recoveries acceptable?	
Sike standards NIST traceable? (Levels D. E)	Ycs No W/A
Spike standards expired? (Levels D, E)	Yeş No WA
LCS/BSS samples analyzed?	Yes No N/A
LCS/BSS results acceptable?	Yos No NA
Standards traceable? (Levels D, E)	
Standards expired? (Levels D, E)	Yes No NA
Transcription/calculation errors? (Levels D, E)	Yes No W
Performance audit sample(s) analyzed?	Yes No N/A
Performance audit sample results acceptable?	Yes No WA
	NO PAS

## GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)	
Duplicate RPD values acceptable?	
Duplicate results acceptable?	Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes No NA
MS/MSD standards expired? (Levels D, E)	
Field duplicate RPD values acceptable?	Yes No NA
Field split RPD values acceptable?	Yes No N/A
Transcription/calculation errors? (Levels D, E)	Yes No (N/)
Comments:	<del></del>
FD 97.590 - nitrite	
	•
6. HOLDING TIMES (all levels)	
Samples properly preserved?	Yes No N/A
Sample holding times acceptable?	
Comments: Nitrate; Nitrite phosphib	rx UR/Jul
Comments: VICITIES TO 1	
pt / ZE S & A	
	· · · · · · · · · · · · · · · · · · ·

## GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

7.	RESUL	T QUAI	NOITATION	AND DETE	CTION LIMIT	'S (all levels)	)			
Result	s reported t	for all re	quested analy	ses?		***********		Yes No	N/A	
Result	s supported	l in the r	aw data? (Le	vels D, E)		******		Yes No (	$\aleph$	
Sampl	les properly	prepare	d? (Levels D,	, E)	, 0 2 4 5 6 1 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	****************	***************	Yos No	MY	
Samples properly prepared? (Levels D, E)  Detection limits meet RDL?							******************	Yes/No N/A		
Trans	cription/cal	culation	errors? (Leve	els D, E)			£ 34 62 666 666 67 67 67 67 67 67 67 67 67 67 6	Yes No	(MA)	
Comn	nents:					<del></del>	·			
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Appendix 6

Additional Documentation Requested by Client

## INORGANICS METHOD BLANK DATA SUMMARY PAGE 07/14/06

CLIENT: THUMANFORD RC-020 K0438 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0606L291

		<b>-</b>			REPORTING	DITOLICA	
SAMPLE	SITE ID	ANALYTE	result	units	LIMIT	FACTOR	
		B#BB5460+P7446+ <del>p=</del> ++6624		*****		********	
BLANKIO	O6LICE62-MB1	Bromide by IC'	2.5 u	MC/KG	2.5	1.0	
		Chloride by IC	2.5 น	MG/KG	2.5	. 1.0	
		Fluoride by IC	2.5 u	MG/KO	2.5	1.0	
	•	Nitrite by IC	2.50 u	MG/XC	2.50	1.0	
		Nitrate by IC	2.50 u	MG/XG	2.50	1.0	
	•	Phosphate by IC	2,5 u	MG/XG	2.5	1.0	
	•	Sulfate by IC	2.5 u	MG/KG	2.5	1.0	
BLANK10	06LV1062-MB1	Chromium VI	0.20 u	HG/KG	0.20	1.0	
BLANKLO	06LIC063-MB1	Bromide by IC	2.5 u	HG/KG	2.5	1.0	
	•	Chloride by IC	2.5 u	MG/KG	2.5	1.0	
		Pluoride by IC	2.5 u	MG/KG	2.5	1.0	
	·	Nitrite by IC	2.50 u	MG/KG	2.50	1.0	
		Nitrate by IC	2,50 u	MG/KG	2.50	1.0	
	•	Phosphate by IC	2.5 u	MG/KG	2.5	1.0	
•		Sulfate by IC	- 2.5 N	MG/XG	2.5	1.0	

GARGATURI MURU BUMBAKAN MULIKI

## INORGANICS ACCURACY REPORT 07/14/06

CLIENT: TNUHANFORD RC-020 K0438 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0606L291

	•		SPIKED	INITIAL	SPIKED	•	DILUTION
SAMPLE	SITE ID	ANALYTB .	SAMPLE	RESULT	AMOURET	<b>TRECOV</b>	PACTOR (SPK)
-			*******			******	
-001	J12N48	Bromide by IC	55.8	0.0	54.0	103,4	1.0
	_	Chloride by IC	55.3	4.1	54.0	94.9	1.0
	•	Fluoride by IC	55.9	2.5 u	54.0	102.8	1.0
	•	Nitrite by IC	55.0	2.54u	54.0	101.9	1.0
		Nitrate by IC	67.5	2.54u	54.0	124.9	1.0
	•	Phosphate by IC	59.0	2.5 u	54.0	109.3	1.0
	•	Soluble Chromium VI	4.5	0.36	4.5	92.5	1.0
-		Insoluble Chromium VI	1520	0.36	1560	97.4	100
•	•	Sulfate by IC	895	293	543	110.9	, 10.0
BLANKLO	06LICE62-MB1	Bromide by IC	47.6	2.5 u	50.0	95.1	1.0
•	•	Chloride by IC	46.4	2.5 u	50.0	92.7	1.0
		Fluoride by IC	48.4	2.5 u	50.0	96.9	1.0.
•	·	Nitrite by IC	47.4	2.50u	50.0	94.8	1.0
		Nitrate by IC	48.0	2,50u	50.0	96.0	1.0
		Phosphate by IC	50.5	2.5 u	50.0	101.1	1.0
	•	Sulface by IC	47.1	2.5 u	50.0	94.2	1.0
BLANKIO	06LVI062-MB1	Soluble Chromium VI	4.0	0.20u	4.0	100	1.0
		Insoluble Chromium, VI	1250	0.20u	1200	104.1	100
BLANK10	DELICO63-MB1	Bromide by IC	49.2	2.5 u	50.0	98.4	1.0
	•	Chloride by IC	47.3	2.5 u	50.0	94.5	1.0
•		Fluoride by IC	48.2	2.5 u	50.0	96.4	1.0
	-	Nitrite by IC	48.4	2.50u	50.0	96.9	1.0
		Nitrate by IC	40.8	· 2,50u	50.0	97.7	1.0
		Phosphate by IC	51.8	2.5 u	50.0	103.5	1.0
		Sulfate by IC	47.4	2.5· u	50.0	94.7	1.0

### INORGANICS PRECISION REPORT 07/14/06

CLIENT: TNUHANFORD RC-020 K0438 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0606L291

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	PACTOR (REP)
	******	74077				
-001REP	J12N48	Bromide by IC	2.5 u	2.5 u	NC	1.0
•	•	Chloride by IC	4.1	2.5 u	90.0	1.0
		Fluoride by IC	. 2.5 u	2.5 u	. MC	1.0
		Nitrite by IC	2.54u	2.53u	NC	1.0
		Nitrate by IC	2.54u	2.53u	NC	1.0
		Phosphate by IC	2,5 u	2.5 u	NC	1.0
		Chromium VI	0.36	0.22u	90.6	. 1.0
•		Sulfate by IC	293	255	13.9	· 5.0
-009REP	J12NC1	pH	2.5	2.4	4.0	1.0